National Renewable Energy Laboratory
Innovation for Our Energy Future

NREL's Renewable Energy Project Finance Tracking Initiative (REFTI)

Q4 2009 Summary

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NREL is a national laboratory of the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy operated by the Alliance for Sustainable Energy, LLC

Housekeeping

- Got audio?
  - Call in #: 888-989-9746
  - participant pass code: 8003870

- Presentation, webinar recording, and data to slides will be made available in a few days at new Webview Finance Portal:

http://financere.nrel.gov/finance/REFTI

- Submit questions via internet conference – we will take at end of presentation

Webinar Agenda

- Intro to REFTI project
- Questionnaire Results
  - Will generally follow REFTI questionnaire design
- Interactive Polling
- Q&A

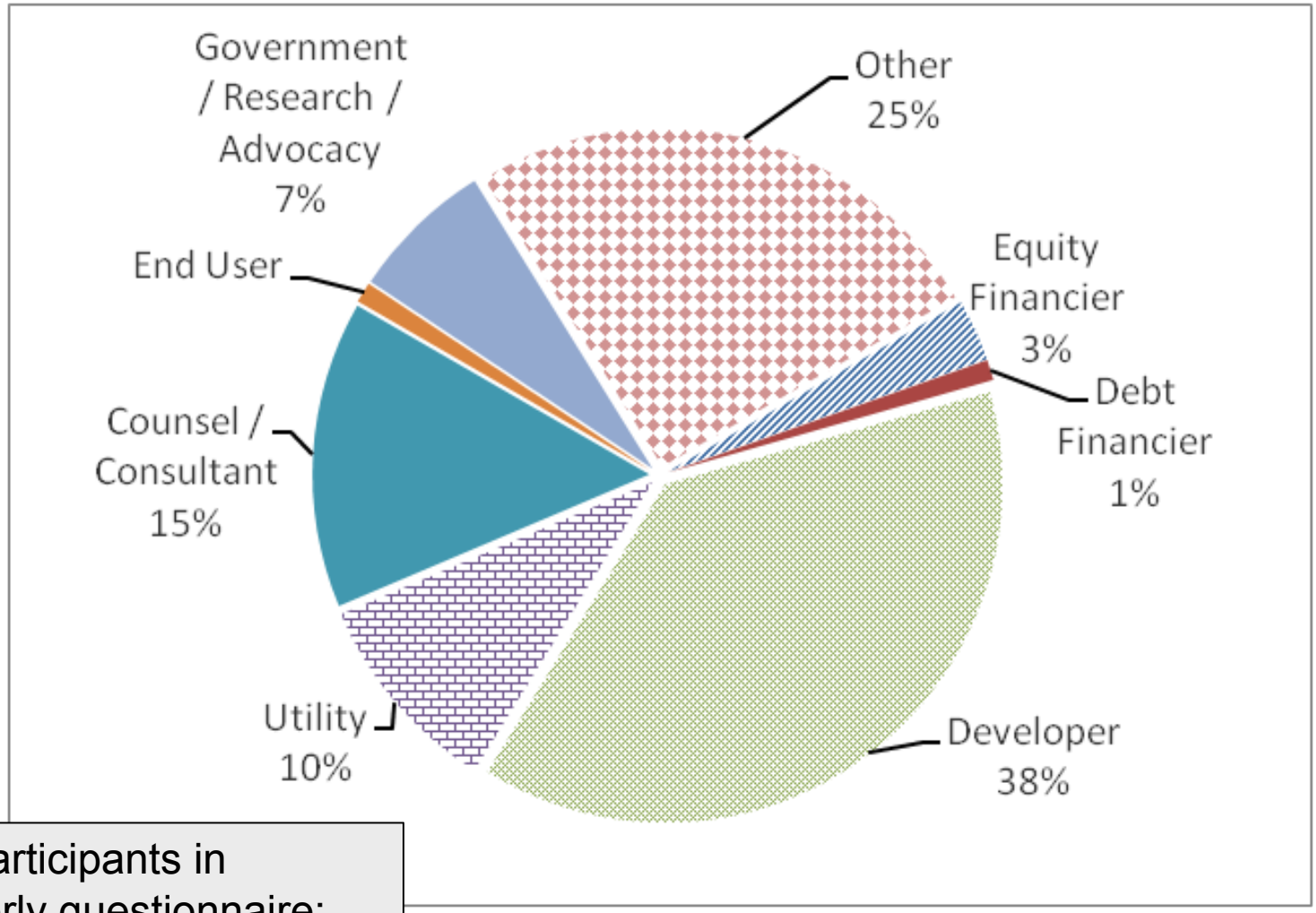
Initial Thanks

- Project sponsor – Office of Strategic Planning and Analysis (SPA) of the DOE
- To all individuals who participated in the Q4 2009 REFTI questionnaire
- To everyone who is participating today
- Colleagues that helped pull this together

Caveats

- **This is a summary of data as reported by REFTI participants.**
- **Data provided was generally not validated by NREL, although certain screens were applied**
- **Potential concerns:**
  - Duplicate data
  - Definition of “financial closure”
  - Small sample size for certain questions
  - Confusion re: questionnaire design

Participation



106 participants in quarterly questionnaire; Developers represented largest constituency

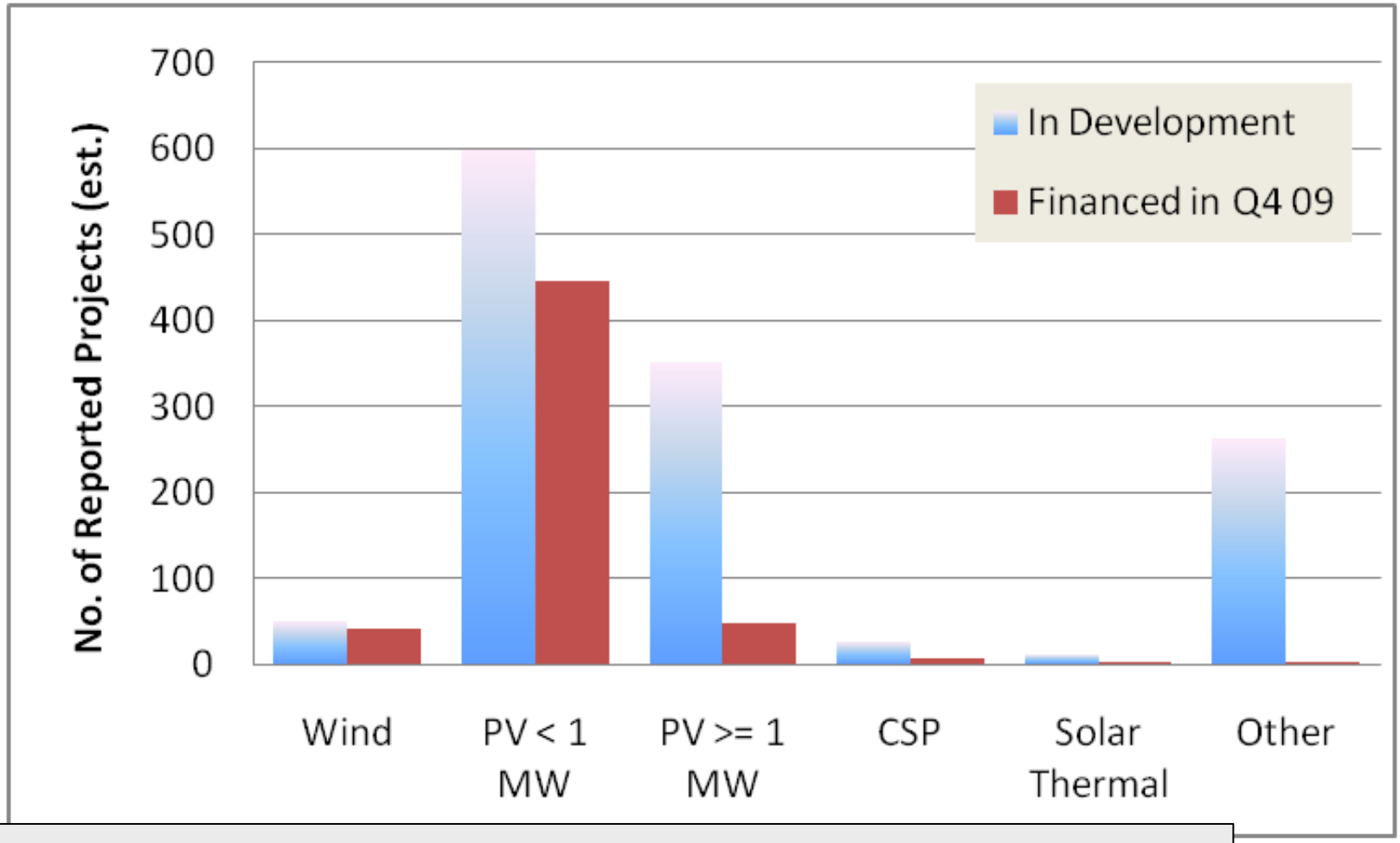
REFTI Questionnaire: Page 2, Q1

1. Please tell us about your projects IN DEVELOPMENT and those that CLOSED FINANCING in Q4 2009...

	No. of Projects in Development	Aggregate Capacity in Development (gross MW)	No. of Projects Financially Closed (Q4 09)	Aggregate Capacity Financially Closed (gross MW)	Form of Financial Closur
Wind					
Solar - PV (< 1 MW)					
Solar - PV (>= 1 MW)					
Solar - CSP					
Solar Thermal (non-elec)					
Geothermal					
Biomass - Elec					
Biomass - Non-elec					
Hydro					
Other Technologies					

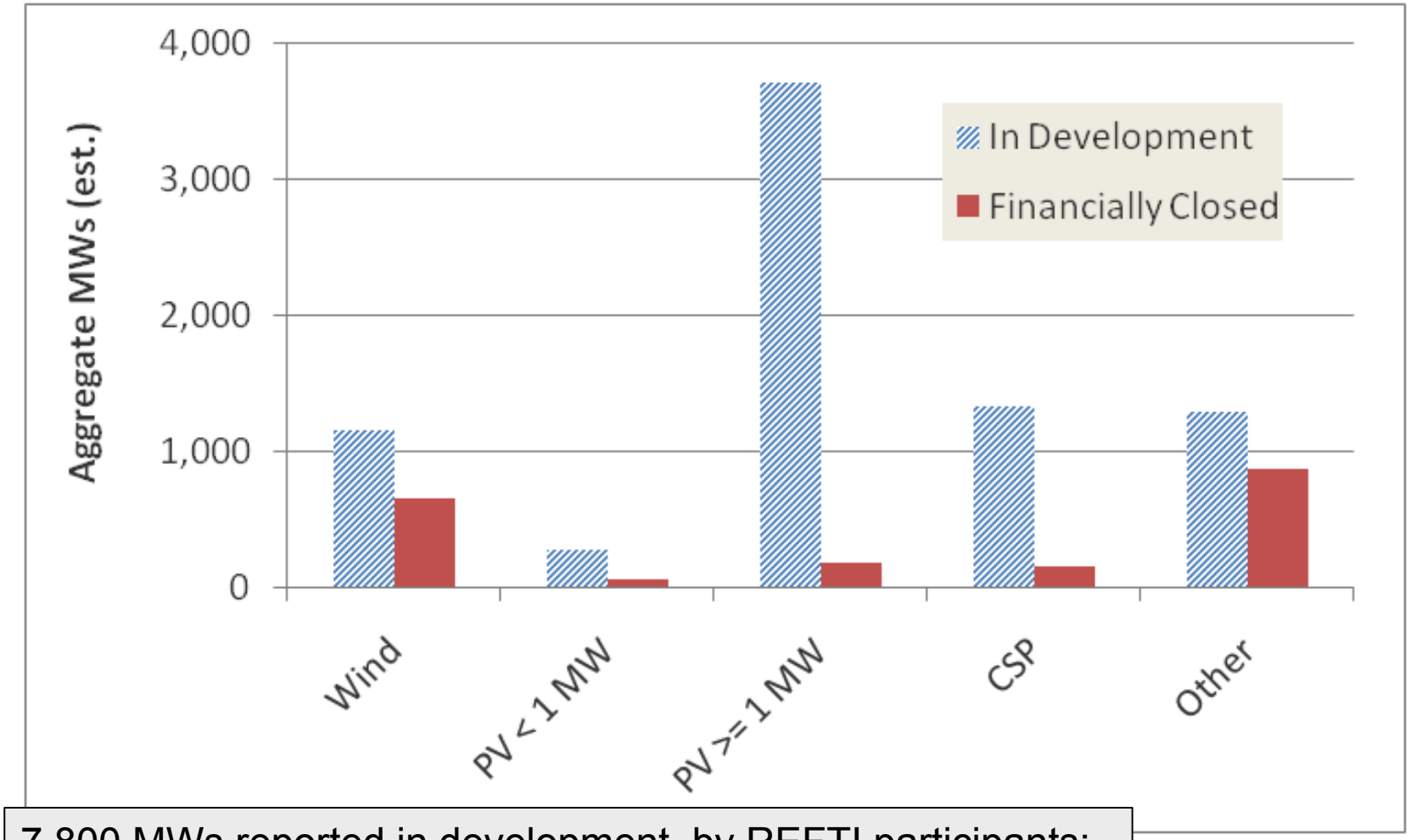
Comments

Number of RE Projects Reported



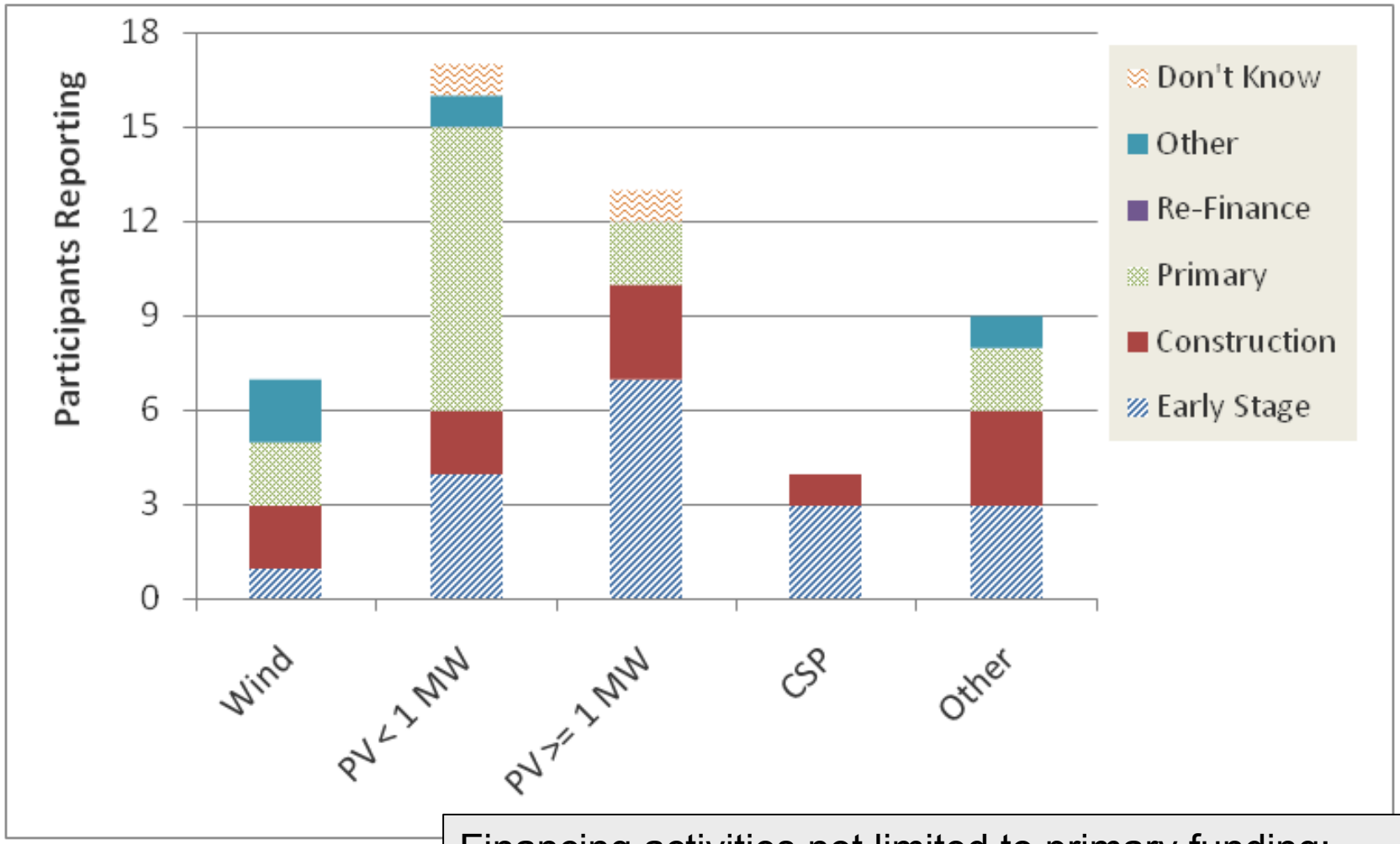
REFTI participants reporting 1305 projects in development and 550 reaching financial closure of some kind; PV dominating landscape
* Estimated based on mid-point of questionnaire bins

MW Capacity of Projects Reported



7,800 MWs reported in development by REFTI participants;
1,950 MWs reported to reach financial closure of some kind;
* Estimated based on mid-points of questionnaire bins

Financing Threshold Reached in Q4 '09



Financing activities not limited to primary funding; Early stage & construction financing reported across most technologies; No refinancings reported

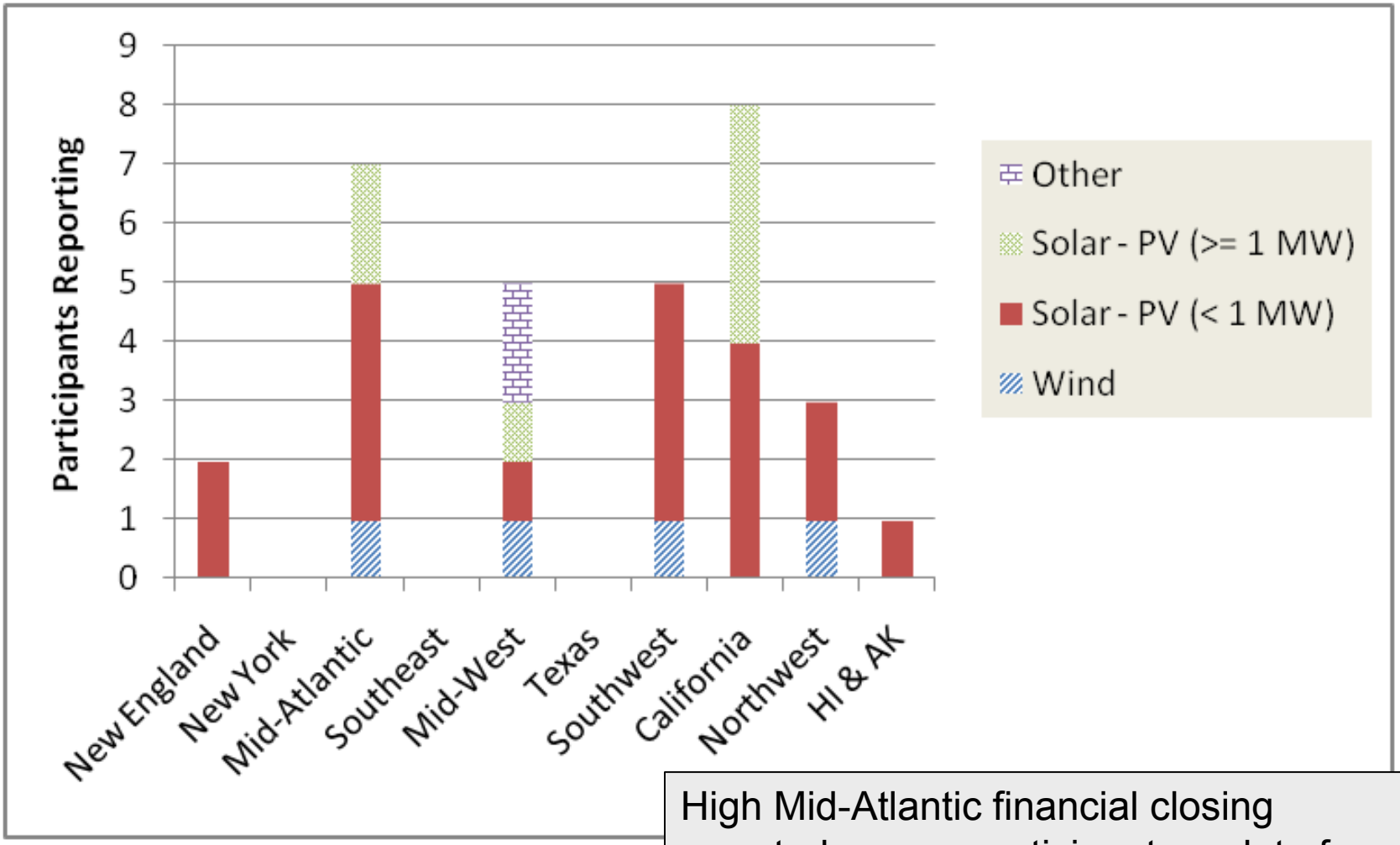
REFTI Questionnaire: Page 2, Q2

2. For projects that closed in Q4 2009, please tell us the PRIMARY LOCATION, POWER PURCHASER, and the TOTAL and DIRECT INVESTMENT...

	Primary Region	Primary Power Purchaser (i.e., Power Sold To)	Total Cost of Combined Projects ($ millions)	Your Total Direct Investment ($ millions)
Wind				
Solar - PV (< 1 MW)				
Solar - PV (>= 1 MW)				
Solar - CSP				
Solar Thermal (non-elec)				
Geothermal				
Biomass - Elec				
Biomass - Non-elec				
Hydro				
Other Technologies				

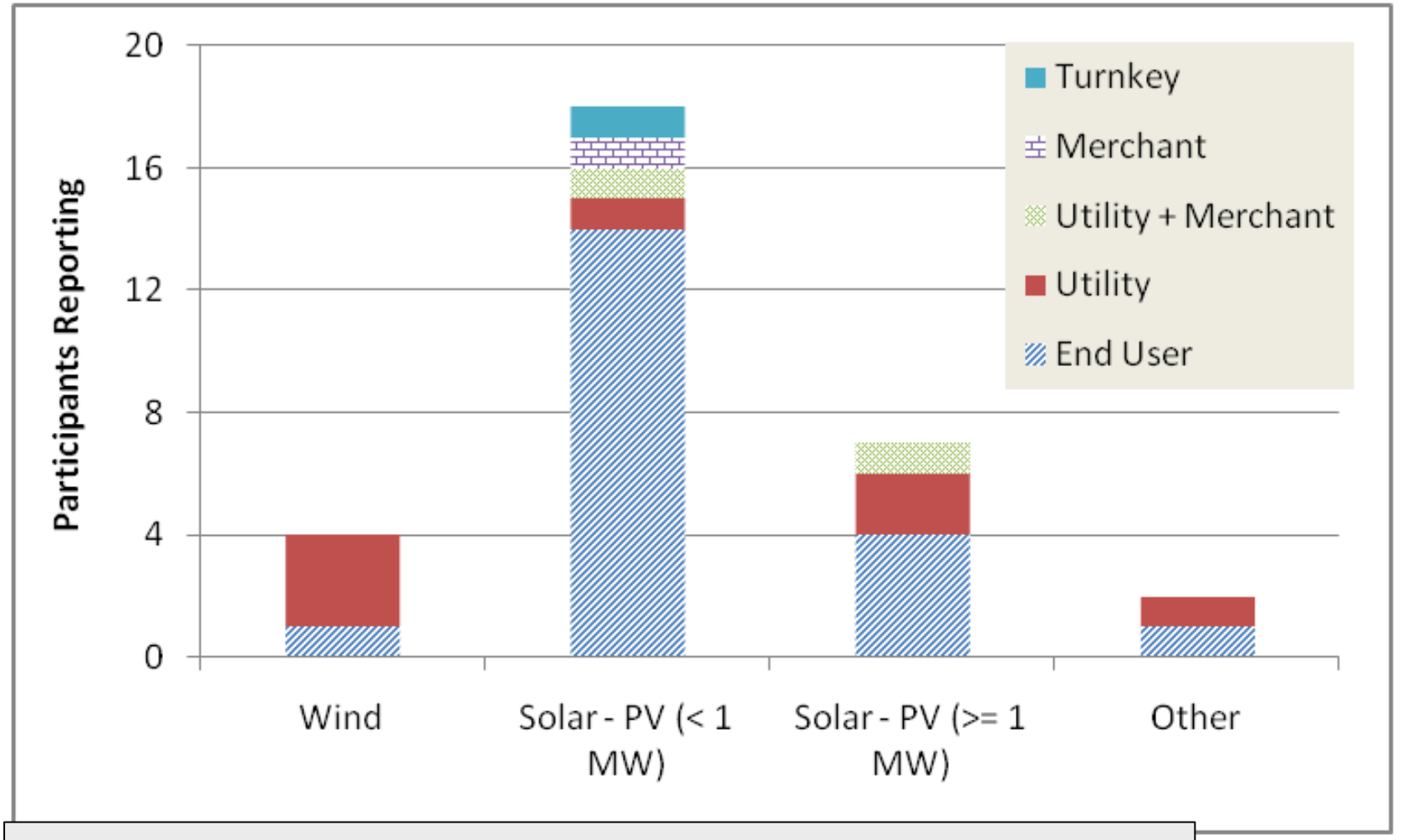
Comments

Geographic Diversity of Financial Closures



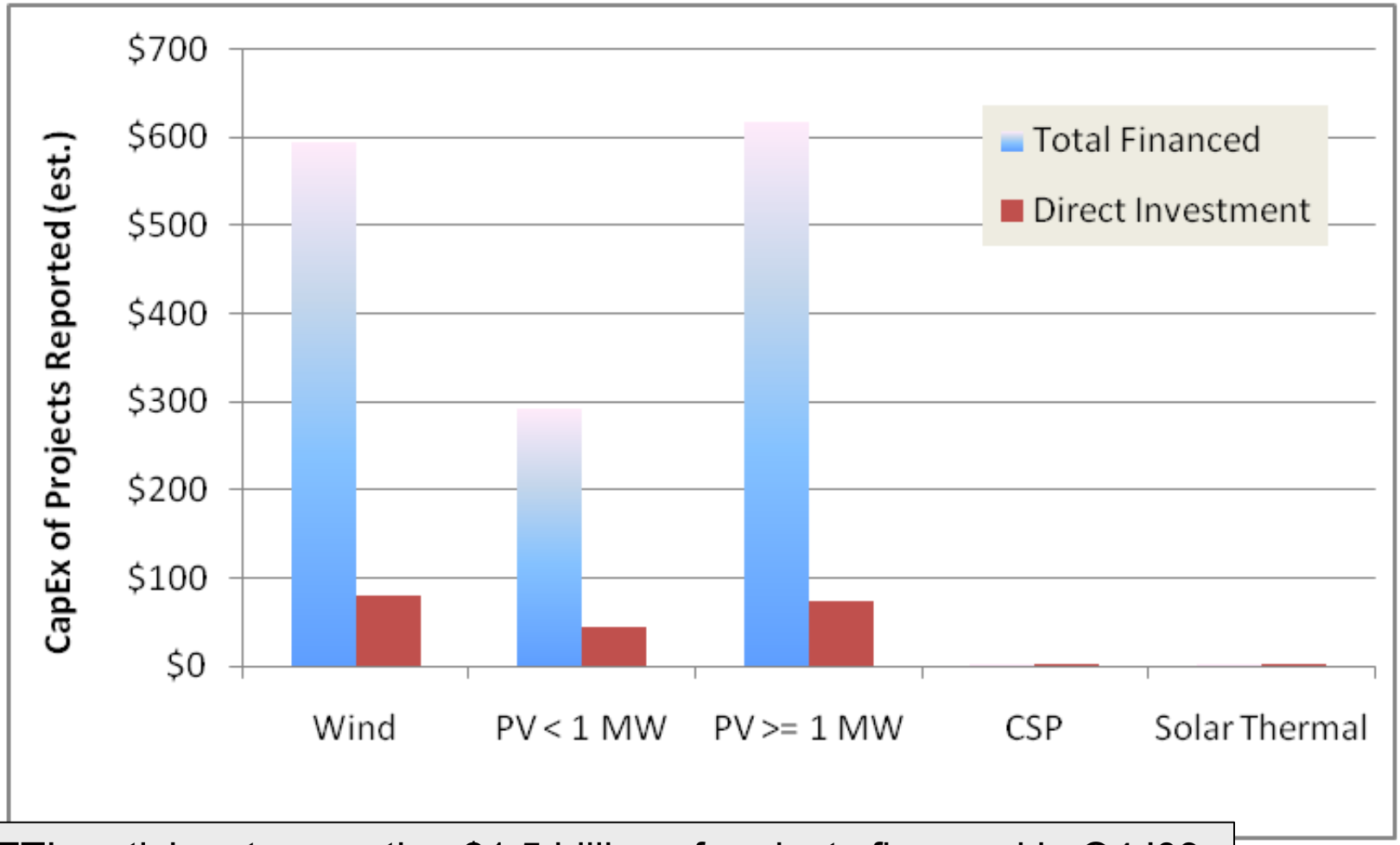
High Mid-Atlantic financial closing reported among participants; a lot of diversity reported in the Mid-West

Power Sold To…



Power primarily sold to end users and utilities; Only one pure merchant arrangement reported, < last REFTI questionnaire

Capital Expenditure Reported ($MM)



REFTI participants reporting $1.5 billion of projects financed in Q4 ’09.
$206 million of direct investment by REFTI participants
*Estimated based on mid-point of questionnaire bins

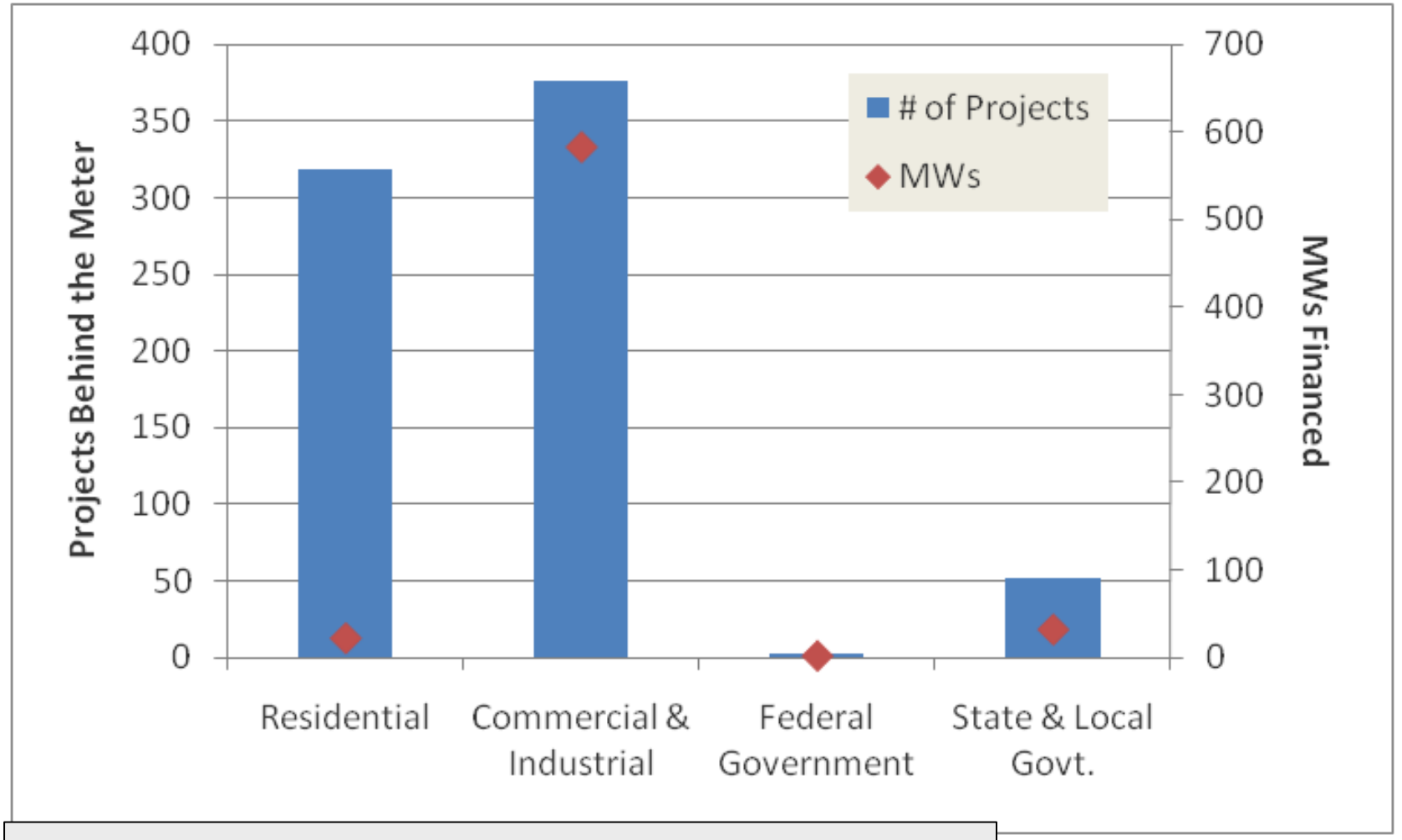
REFTI Questionnaire: Page 2, Q3

3. For your projects that are ON-SITE and BEHIND-THE-METER, please tell us about the customer host...

	Number of Deals	Nameplate Capacity (aggregate MW)	Typical Customer Financing Structure	Avg. Customer Payback (yrs)	Avg. Customer Discount Rate (%)
Residential					
Commercial & Industrial					
Federal Government					
State & Local Govt.					

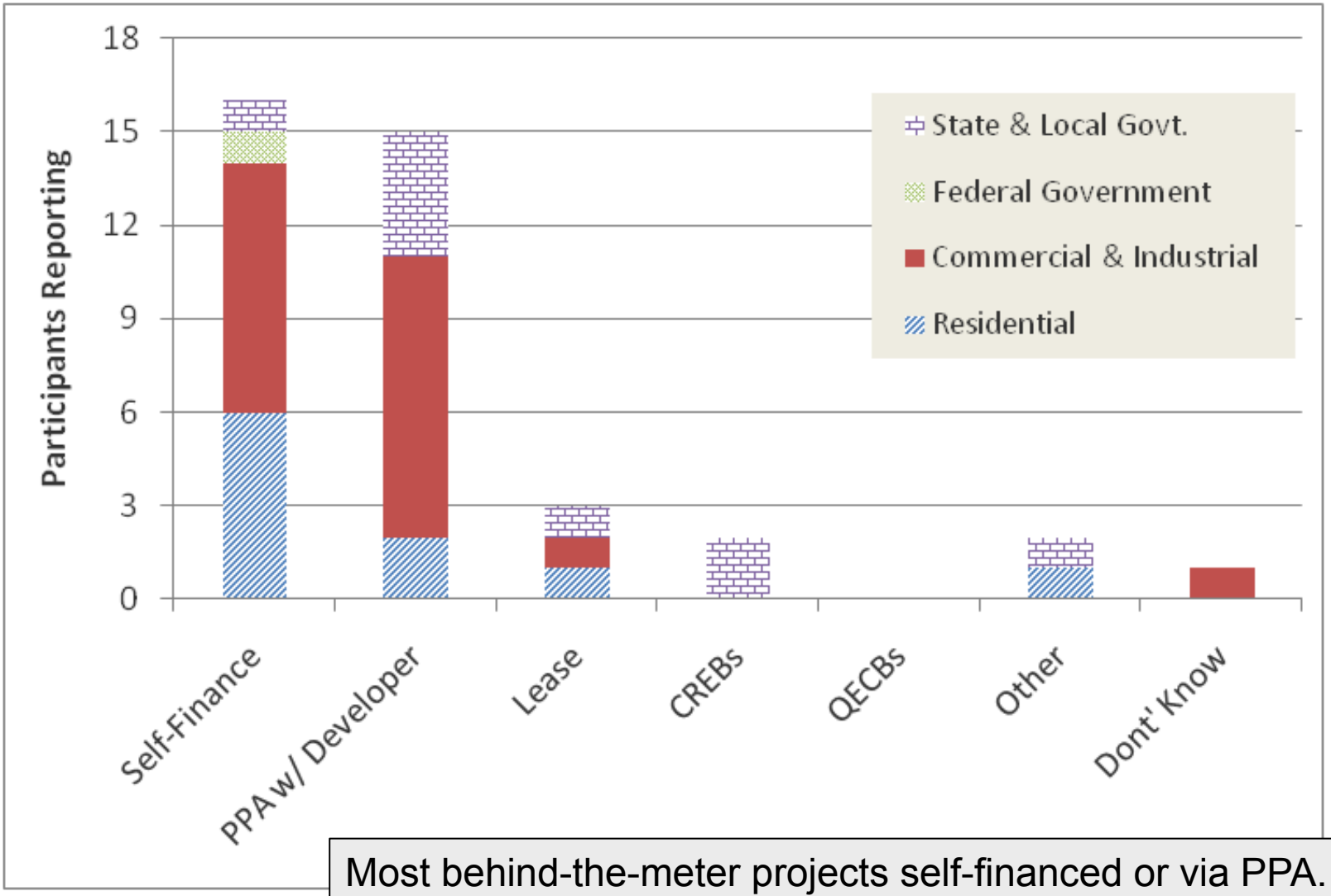
Comments

and MWs of Projects with Customer Host



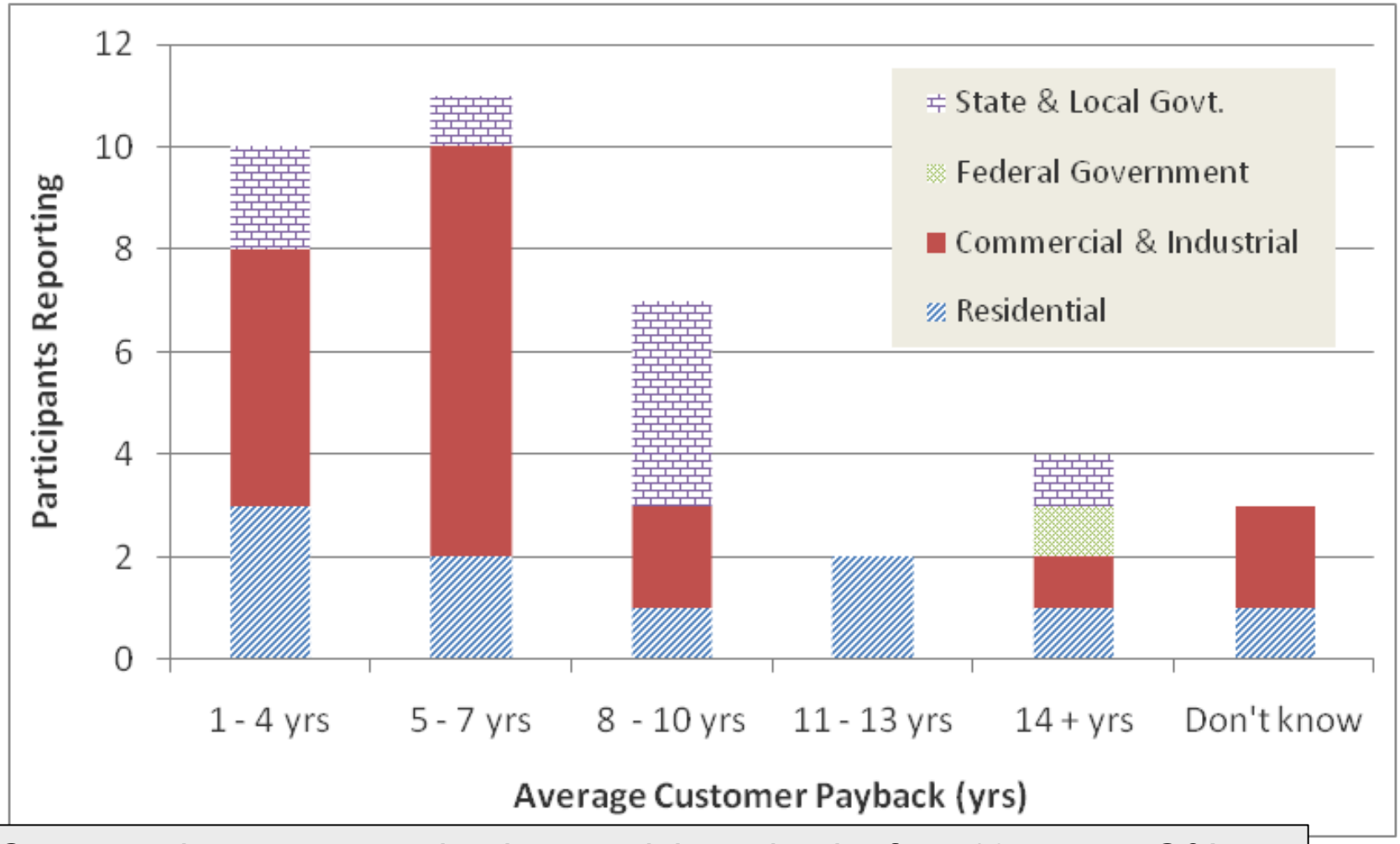
Projects behind the meter (i.e., with customer host);
Large # of MWs at C&I facilities reported

Form of Customer Host Financing



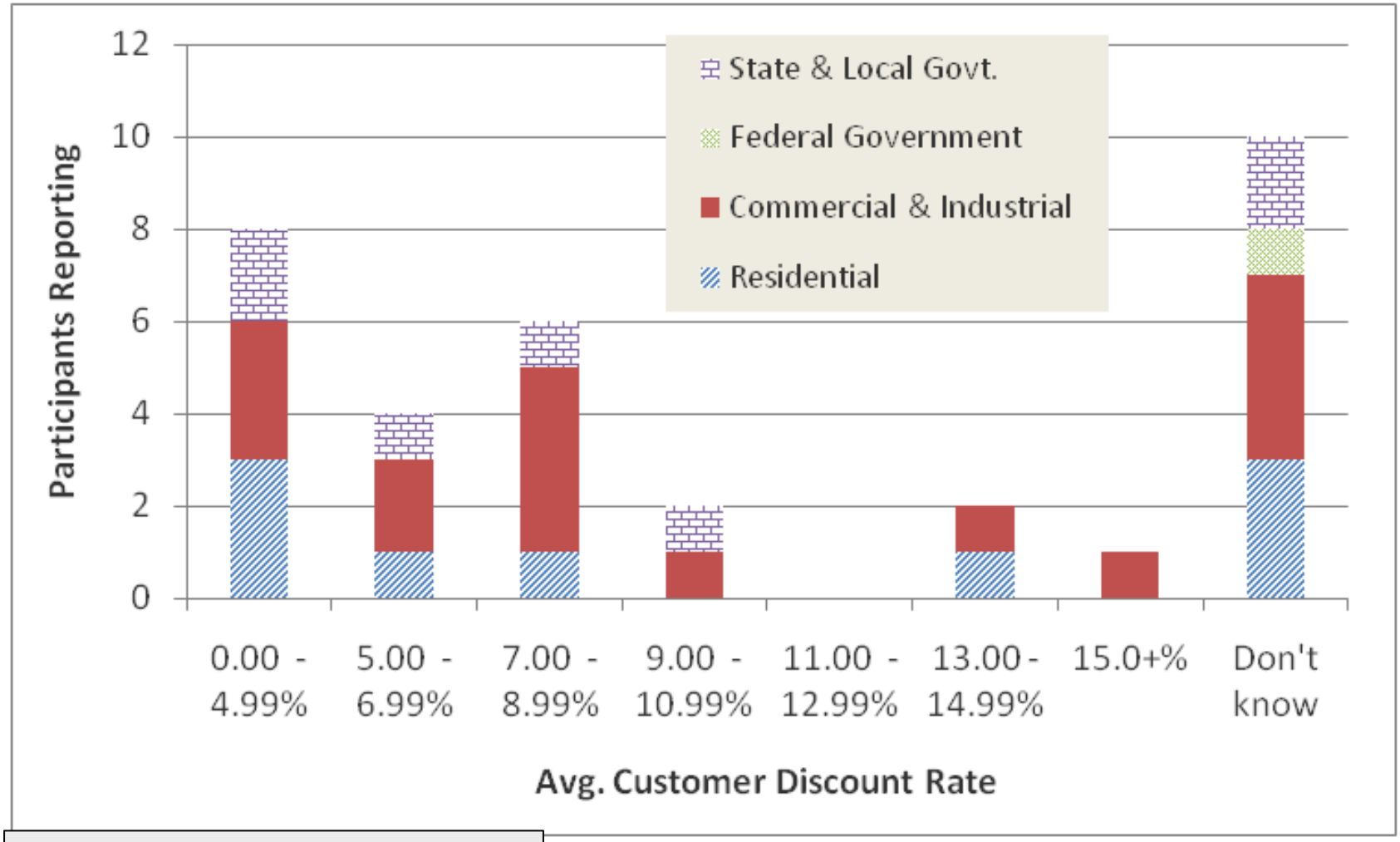
Most behind-the-meter projects self-financed or via PPA.
Very few CREBs & QECBs reported

Customer Host Payback (yrs)



Customer hosts expected to have quick payback of <= 10 years. C&I customers frequently had paybacks of 7 years or less.

Customer Host Discount Rate



Customer discount rates primarily in single digits

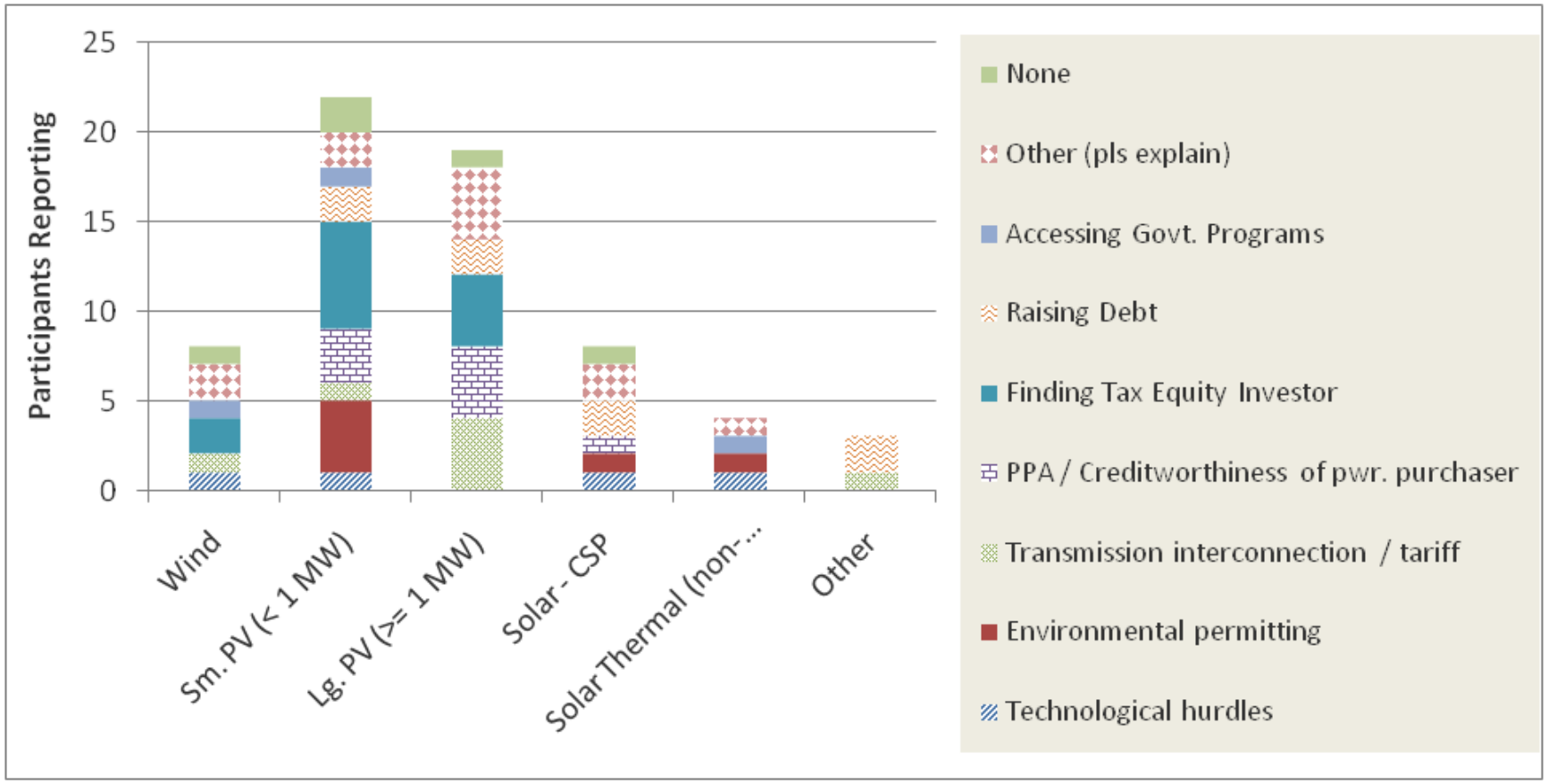
REFTI Questionnaire: Page 2, Q4

4. What was the LARGEST BARRIER to RE project development and how did it impact your projects

	Barrier	Impact
Wind		
Solar - PV (< 1 MW)		
Solar - PV (>= 1 MW)		
Solar - CSP		
Solar Thermal (non-elec)		
Geothermal		
Biomass - Elec		
Biomass - Non-elec		
Hydro		
Other Technologies		

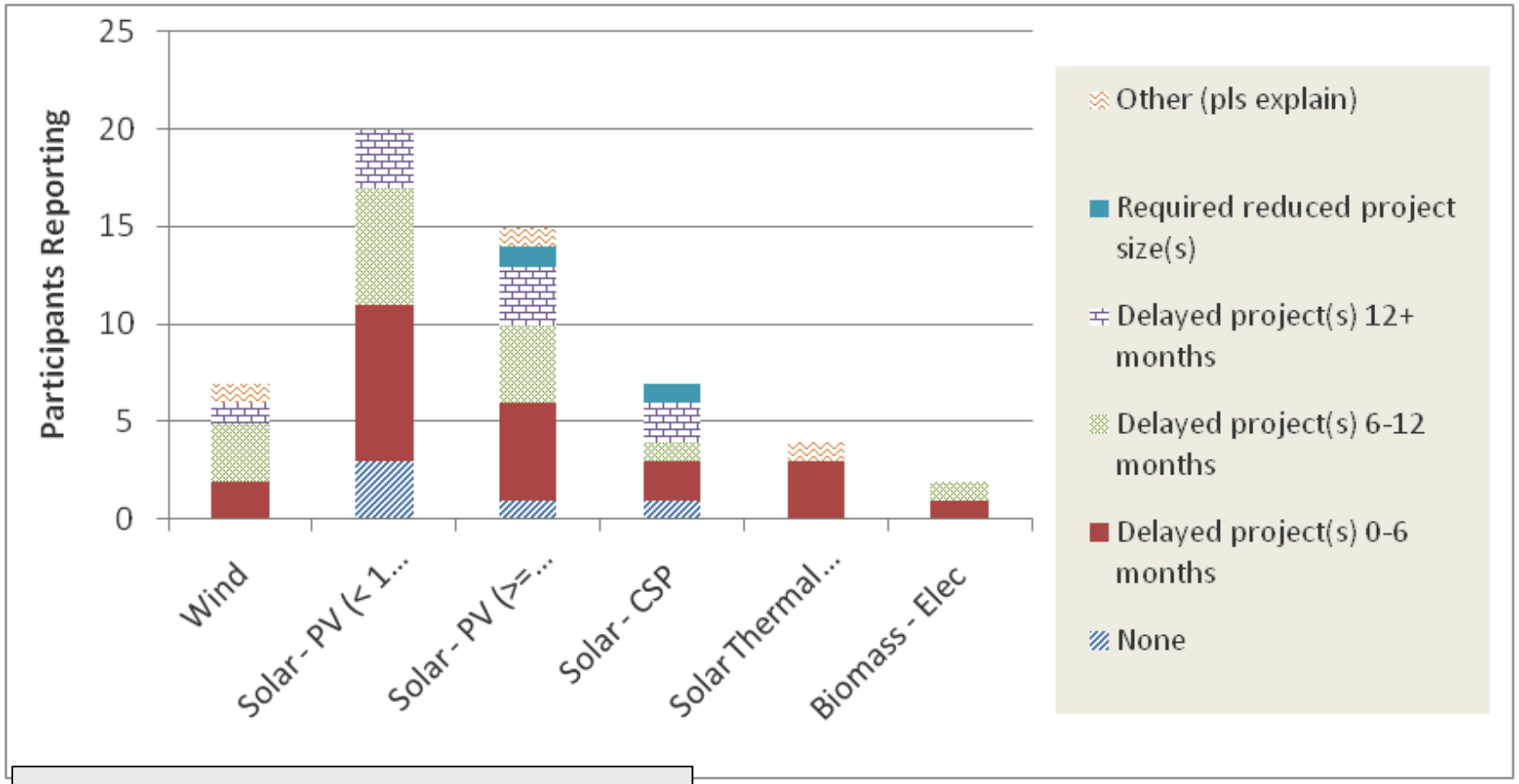
Comments

Largest Barrier to Project Development



Finding tax equity still critical barrier to financing. But all barriers referenced across RE technologies

Consequence of Project Development Barrier(s)



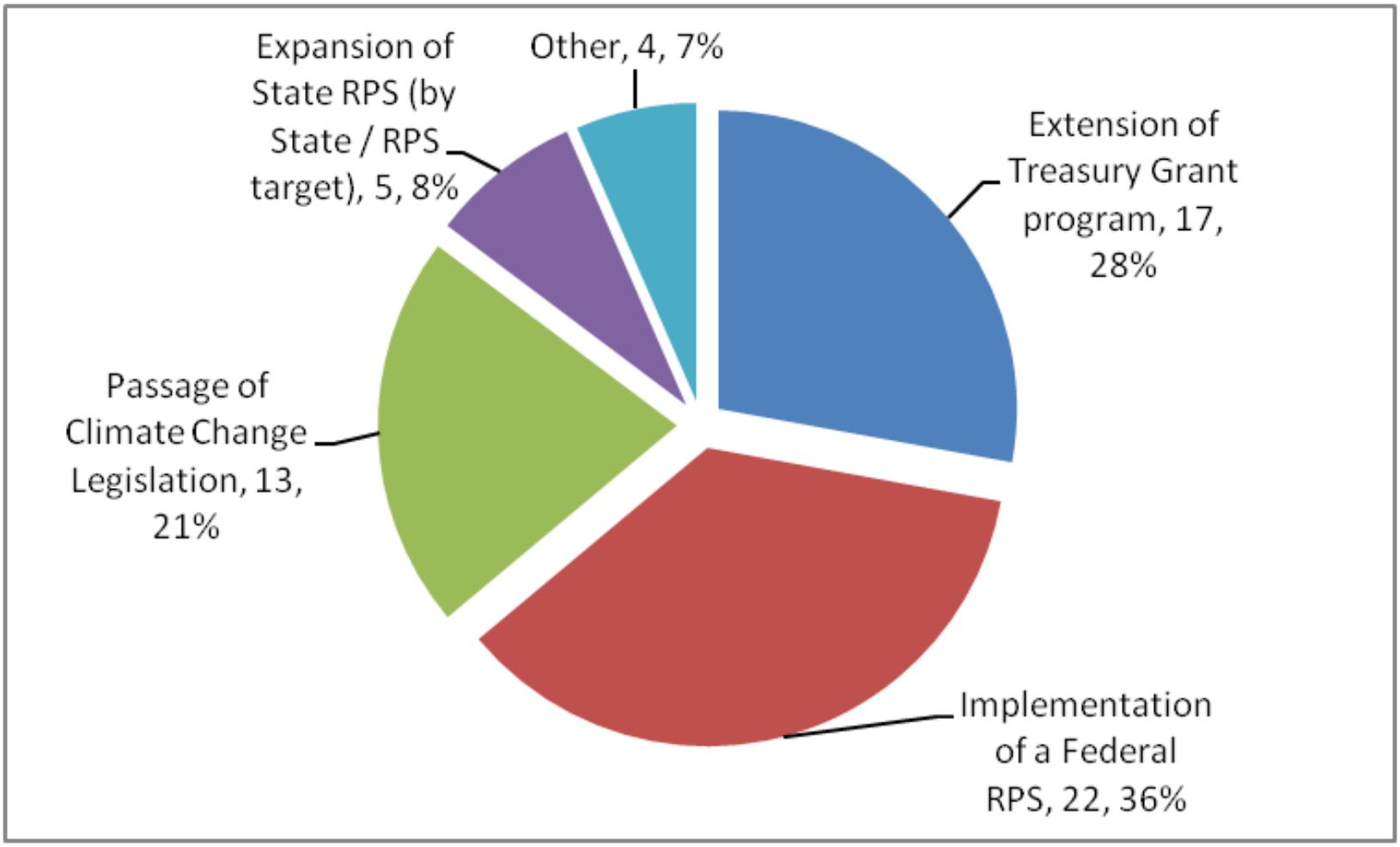
Development barriers led to project delays primarily less than 1 year, but frequently over

Participant Feedback on Dev. Barriers

"…in general, the biggest barrier we now see to getting projects built is obtaining long-term utility PPAs at attractive rates in an environment where electricity demand and prices are down."

Webinar Poll #1:

What is Most Important Policy to Promote Renewables?



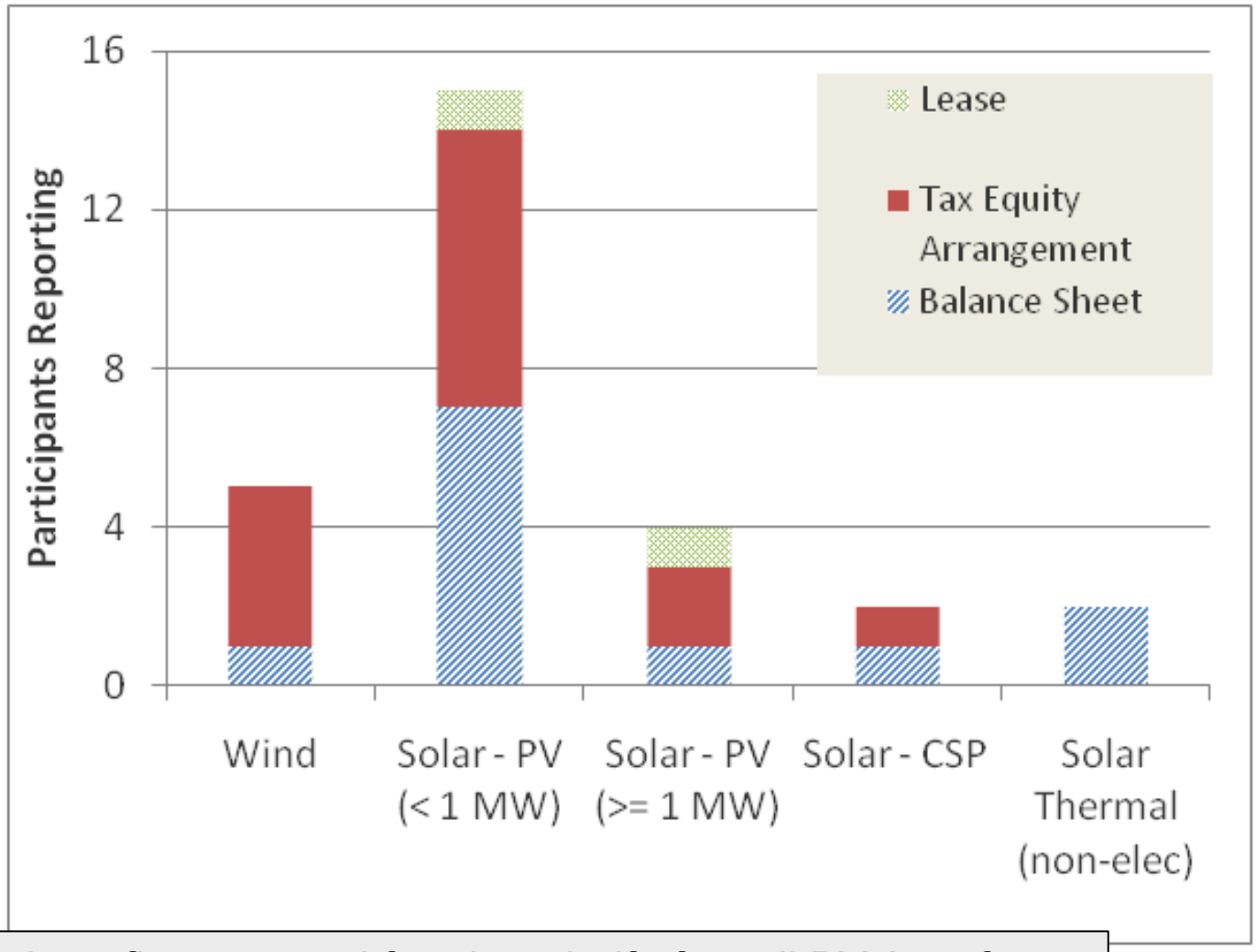
REFTI Questionnaire, Page 3, Q1

1. Select the primary typical FINANCIAL STRUCTURE characteristics of your projects that closed in prior quarter...

	Financial Structure	Depreciation	Federal Incentive	State Incentive
Wind				
Solar - PV (< 1 MW)				
Solar - PV (>= 1 MW)				
Solar - CSP				
Solar Thermal (non-elec)				
Geothermal				
Biomass - Elec				
Biomass - Non-elec				
Hydro				
Other Technologies				

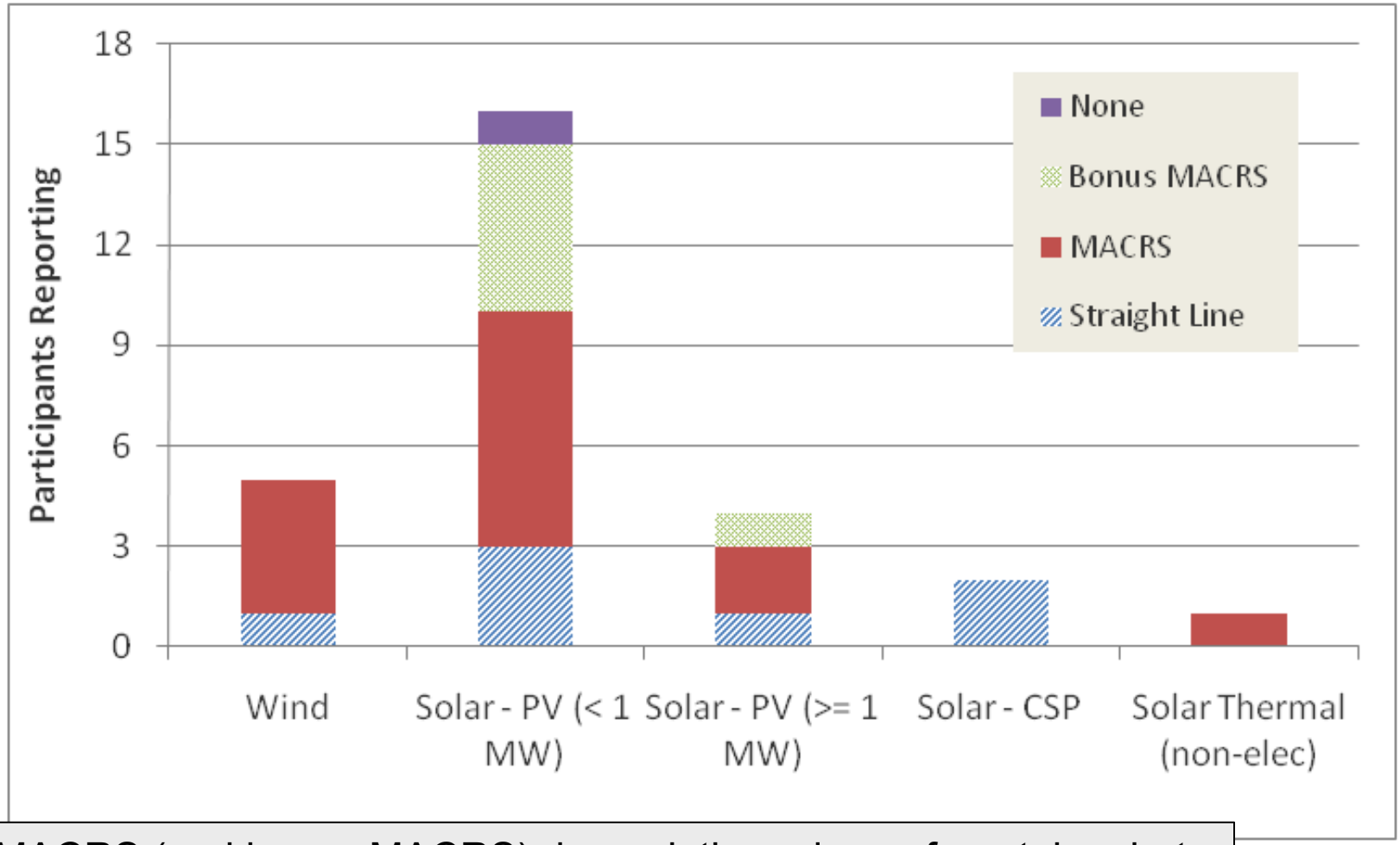
Comments

Financial Structure of Projects Reported



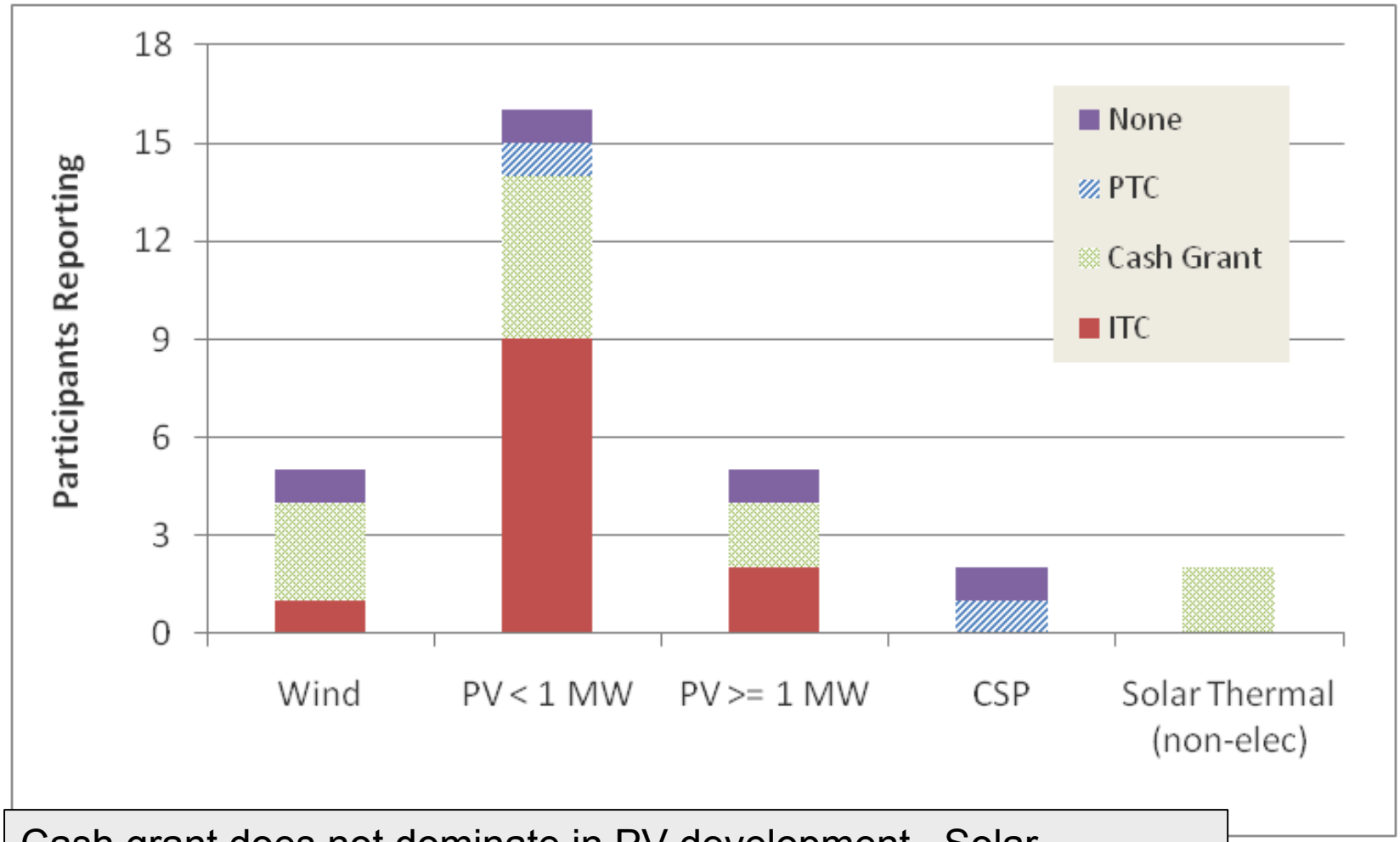
Balance sheet finance used for about half of small PV, less for most other technologies; Financial structures not widely reported

Form of Depreciation Taken



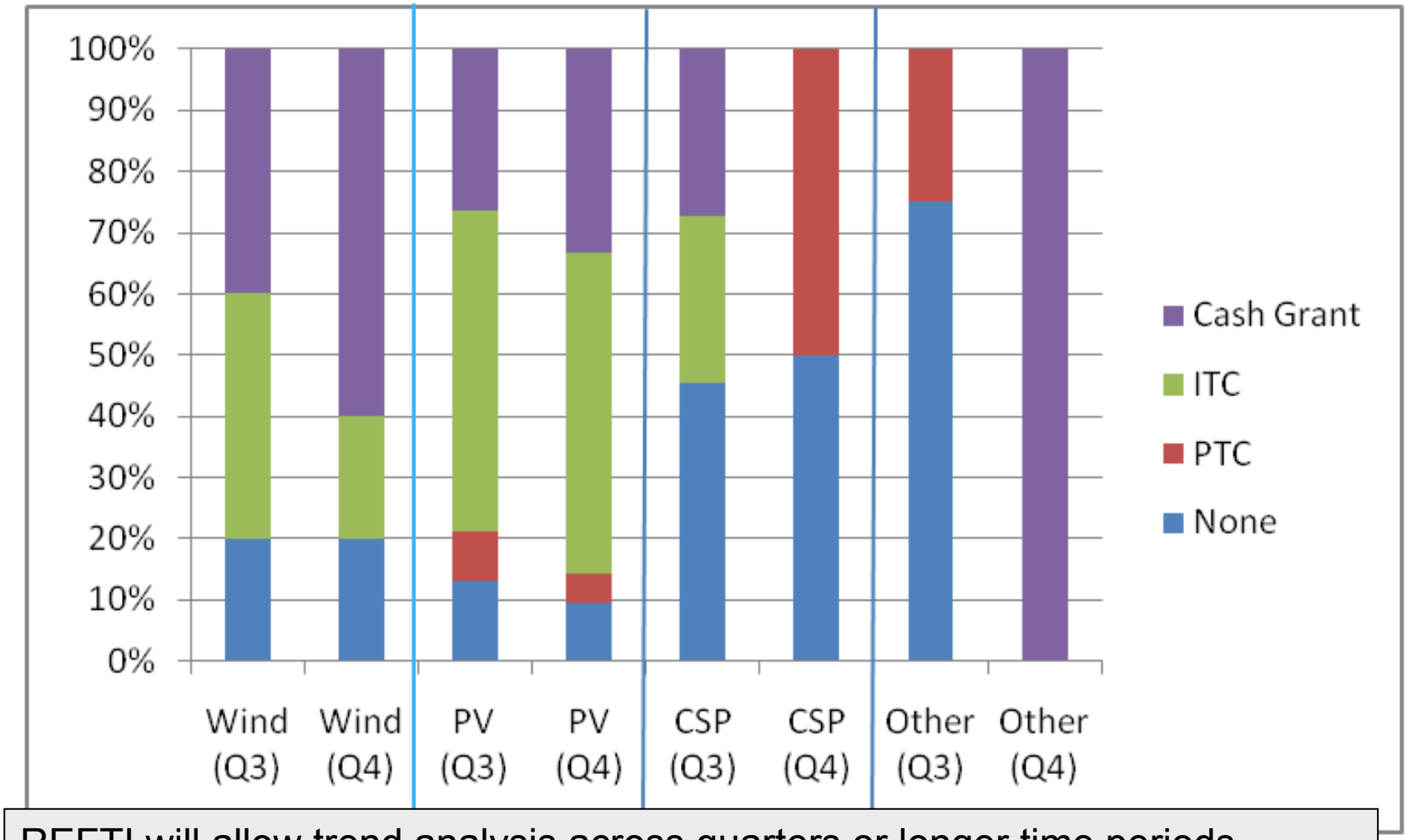
MACRS (and bonus MACRS) depreciation primary form taken but Straight Line still useful; 4 of 5 wind projects report using MACRS, 15 of 20 PV projects utilizing MACRS or Bonus MACRS

Form of Federal Incentive Taken



Cash grant does not dominate in PV development. Solar developers reporting use of PTC (not allowed); All technologies reporting no federal tax incentive applied

Use of Federal Incentive – REFTI Q3 & Q4



REFTI will allow trend analysis across quarters or longer time periods. Participants indicate higher use cash grants for wind projects; ITC most commonly used in PV projects

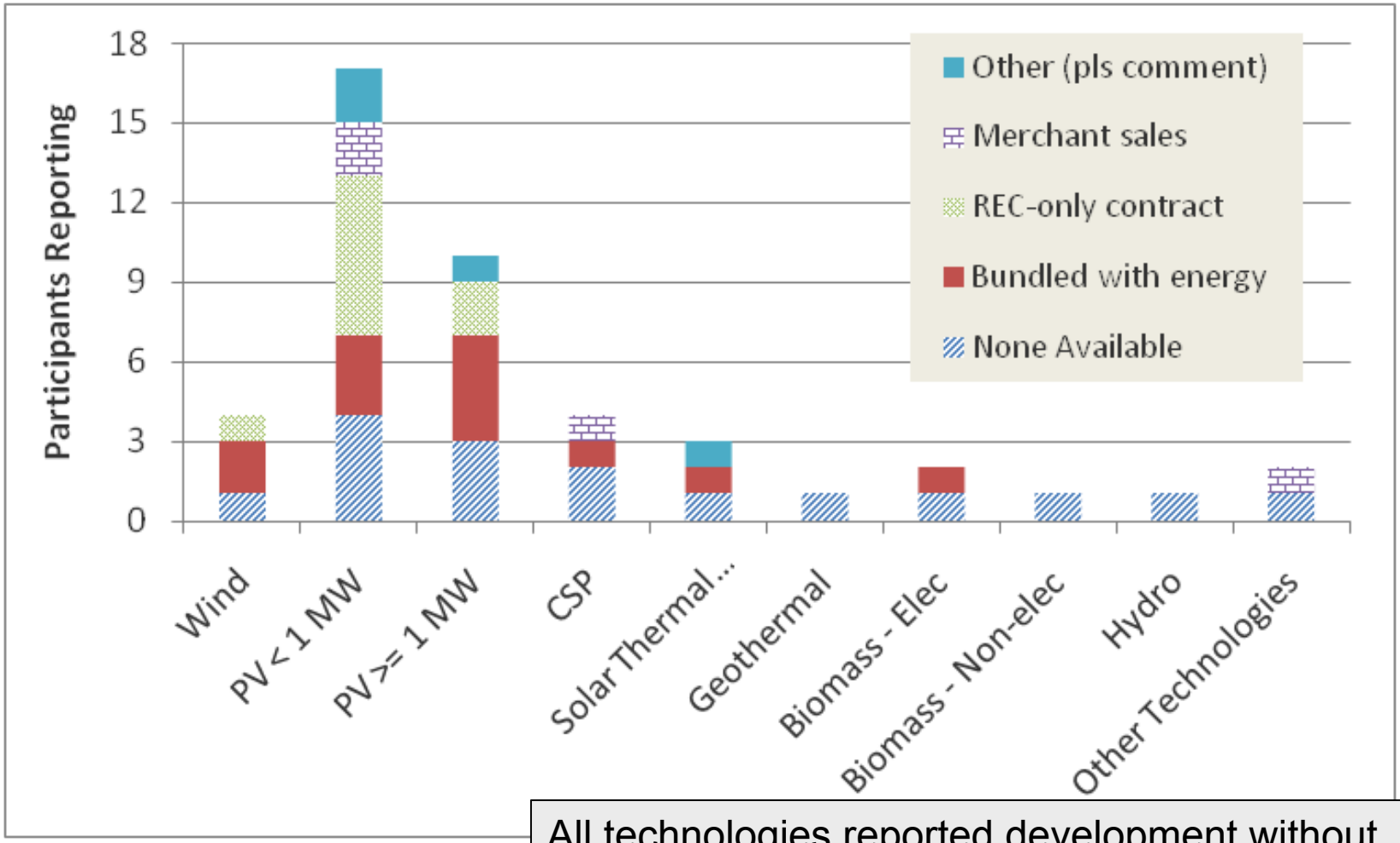
REFTI Questionnaire: Page 3, Q2

2. Provide the typical expected method of REC Sales, REC Type, and REC Contract Duration by technology...

	REC Sales	REC Type	REC Contract Term (yrs)
Wind			
Solar - PV (< 1 MW)			
Solar - PV (>= 1 MW)			
Solar - CSP			
Solar Thermal (non-elec)			
Geothermal			
Biomass - Elec			
Biomass - Non-elec			
Hydro			
Other Technologies			

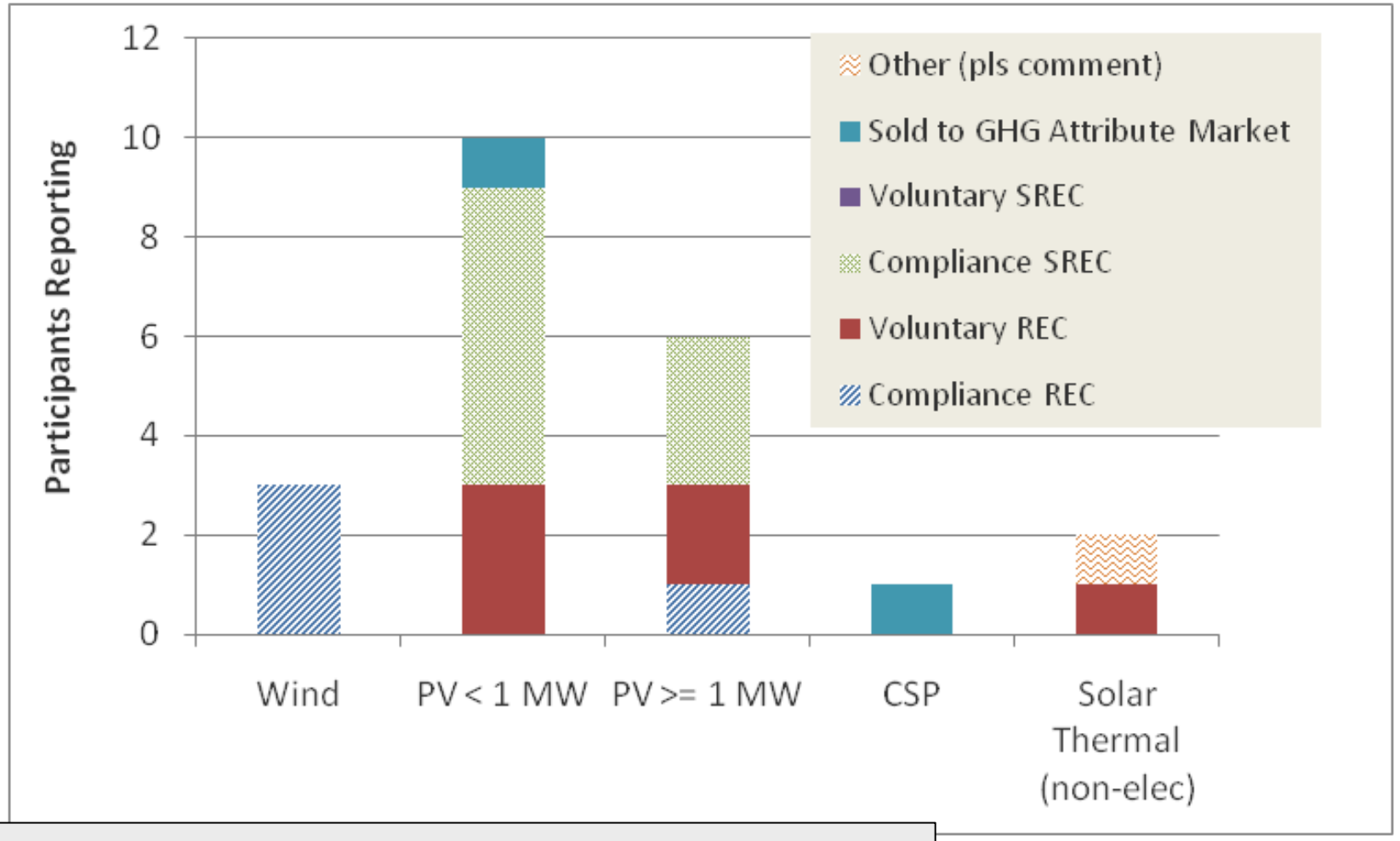
Comments

Form of REC Sales



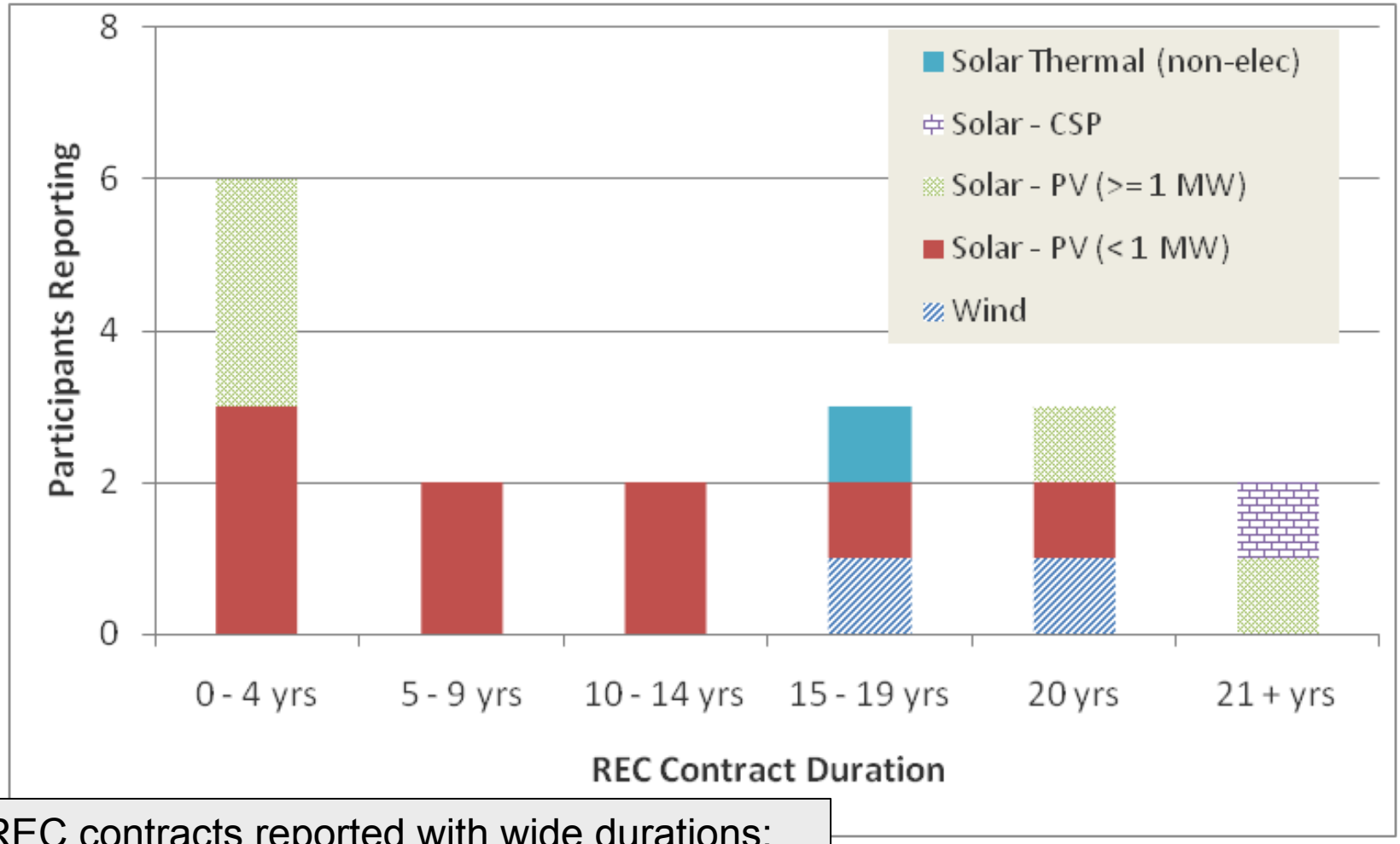
All technologies reported development without use of RECs; REC-only contracts useful in small PV; some merchant sales of RECs utilized

Type of RECs Sold



Most PV reported developed with (compliance) SRECs. Voluntary RECs also critical

REC Contract Duration



REC contracts reported with wide durations; most commonly at < 5 years; 2 wind projects reported at 15- 20 years

Participant Feedback on RECs

"Although the REC component of the PPA price is not the largest (relative to energy), REC's are what make the PPA work. And the cash grant program was key to getting our deal done. Our deal may not have happened without the grant."

"Loss of bonus depreciation, reduction in Utility REC amount, and local Colorado Personal Property tax are near deal killers for PPAs in Colorado"

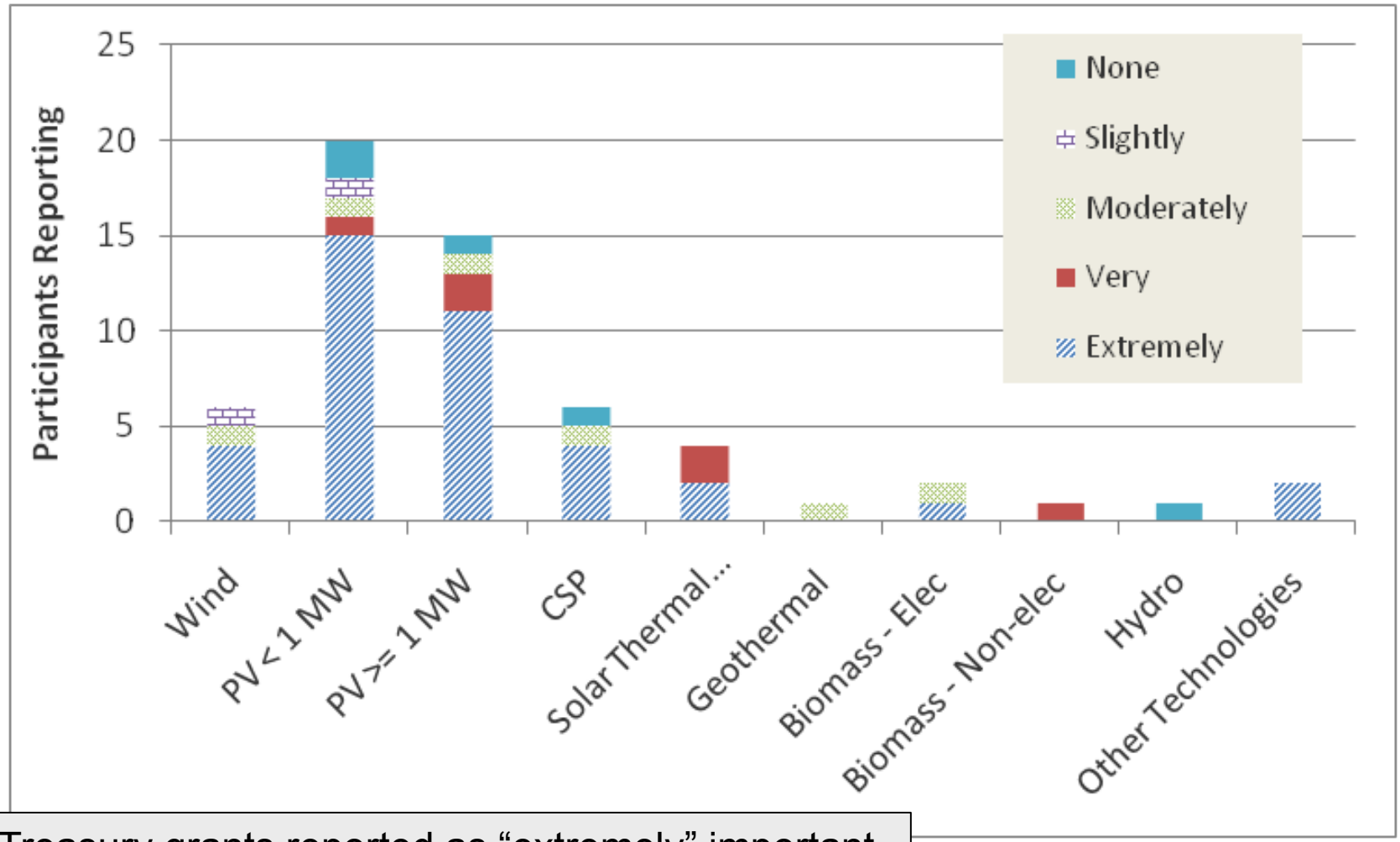
REFTI Questionnaire: Page 3, Q3

3. Please comment on the IMPORTANCE of different INCENTIVE PROGRAMS to developing your projects...

	Treasury Grants	State Incentives	Renewable Portfolio Standards (REC purchase)
Wind			
Solar - PV (< 1 MW)			
Solar - PV (>= 1 MW)			
Solar - CSP			
Solar Thermal (non-elec)			
Geothermal			
Biomass - Elec			
Biomass - Non-elec			
Hydro			
Other Technologies			

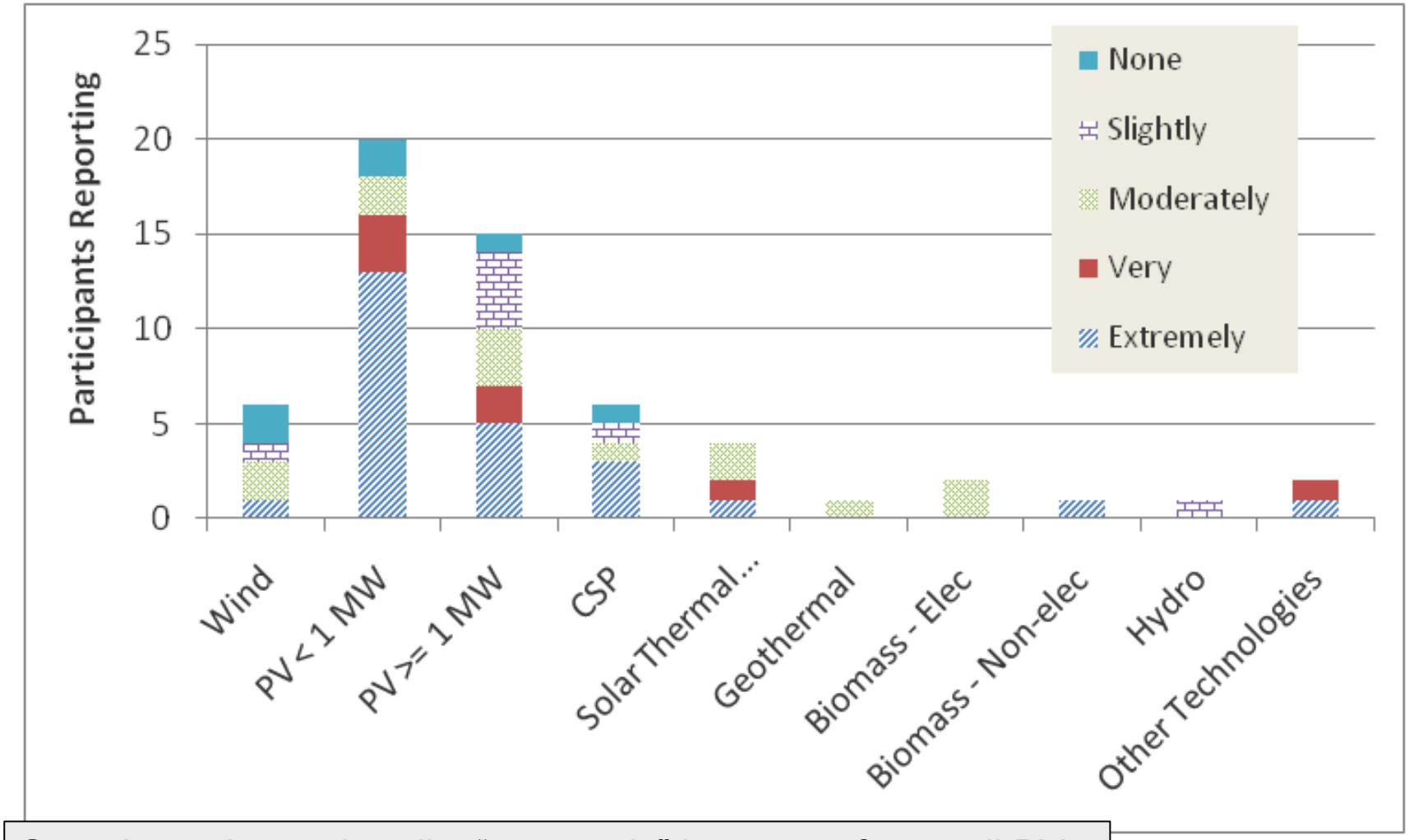
Comments

Importance of Incentives: Treasury Grants



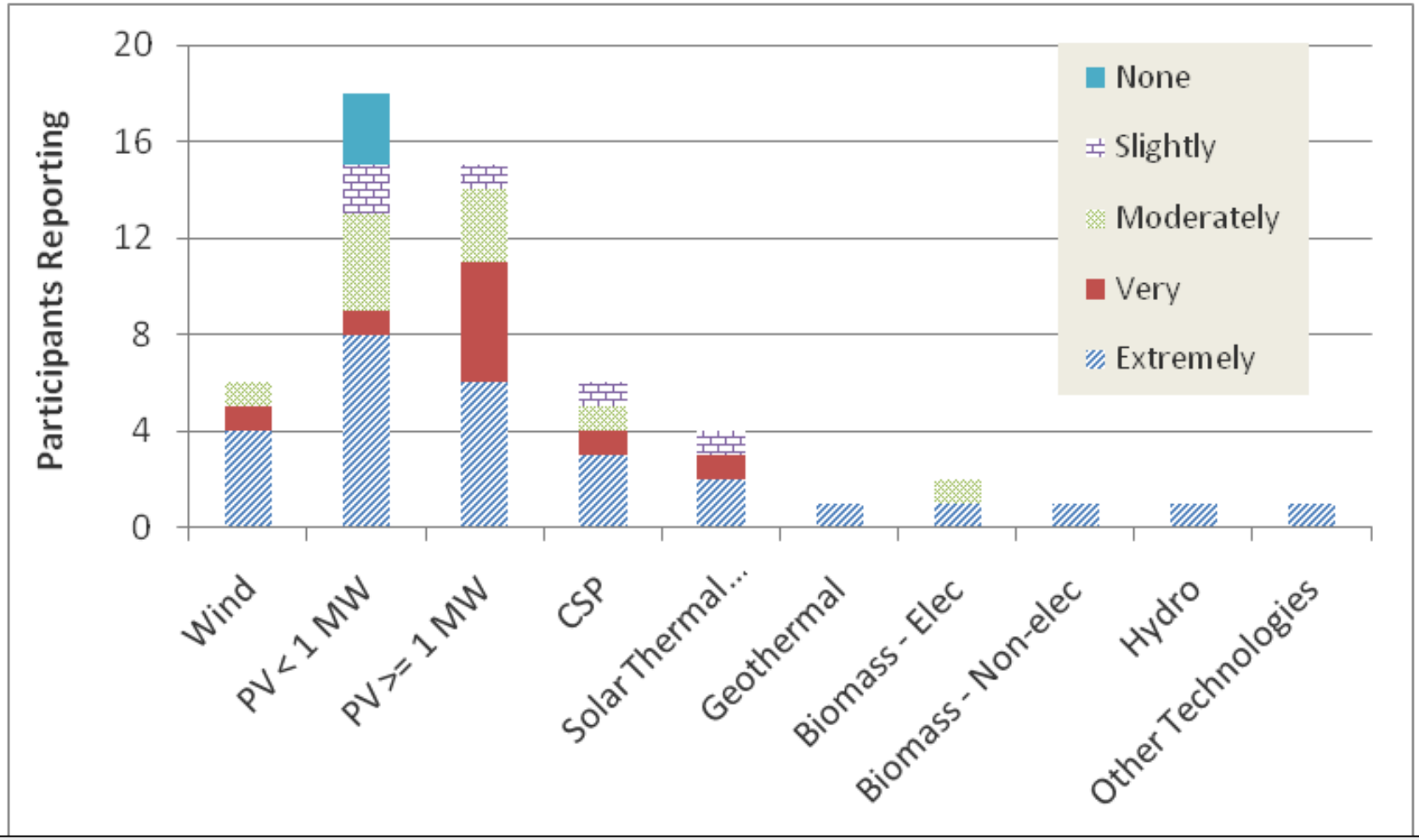
Treasury grants reported as “extremely” important across technologies (more than all other categories combined)

Importance of Incentives: State Incentives



State incentives primarily "extremely" important for small PV; Other techs reported more mixed response

Importance of Incentives: Portfolio Stds.



Re Portfolio Standards (RPS) very or extremely important for wind, small & large PV, CSP; But more responses at Moderate to None across techs than for TGs

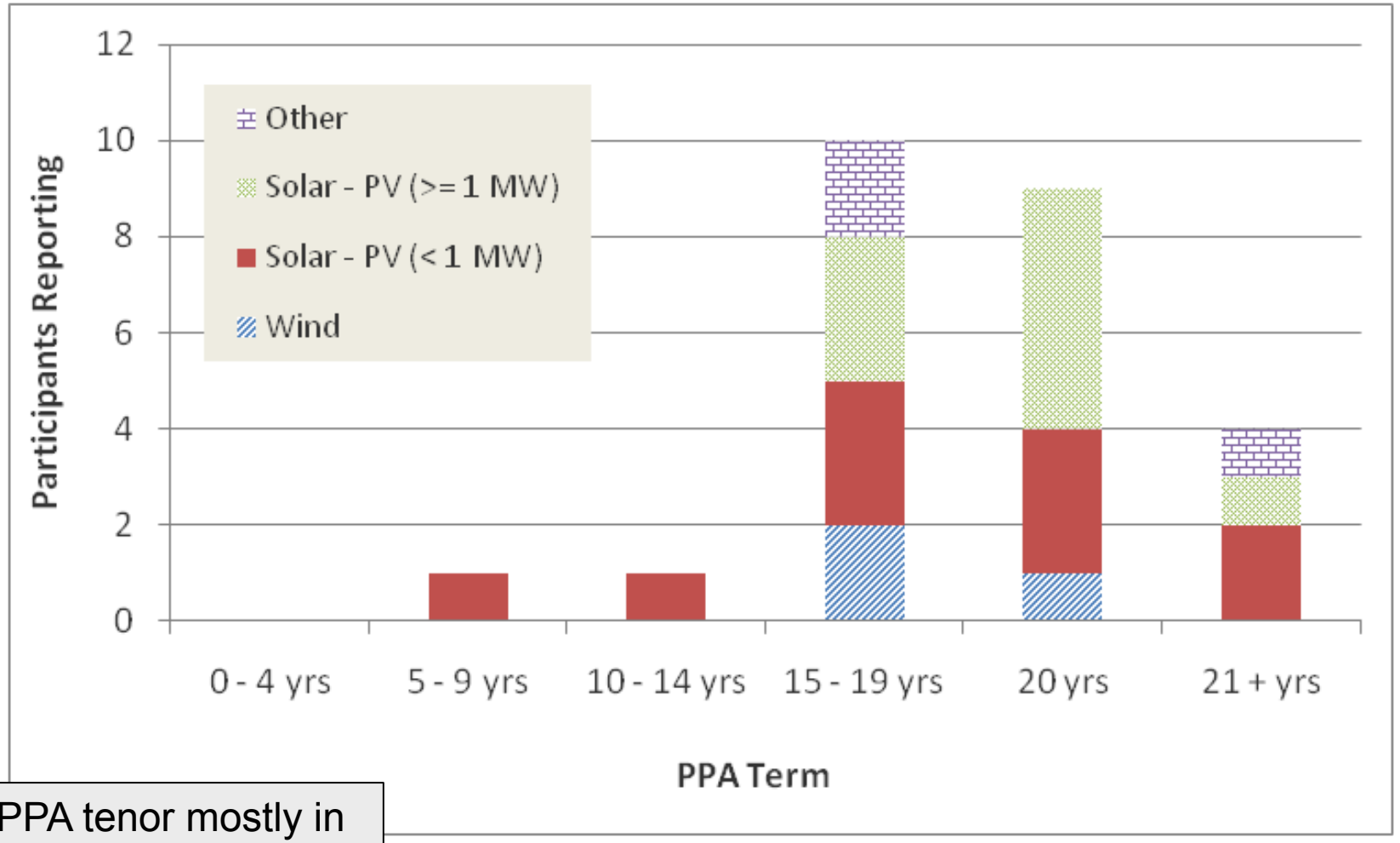
REFTI Questionnaire: Page 3, Q4

4. Please provide the following parameters to the typical Power Purchase Agreement (PPA) used in prior quarter...

	PPA Term (yrs)	PPA Price in Yr 1	PPA Price Escalation (%)	Customer Buyout Option
Wind				
Solar - PV (< 1 MW)				
Solar - PV (>= 1 MW)				
Solar - CSP				
Solar Thermal (non-elec)				
Geothermal				
Biomass - Elec				
Biomass - Non-elec				
Hydro				
Other Technologies				

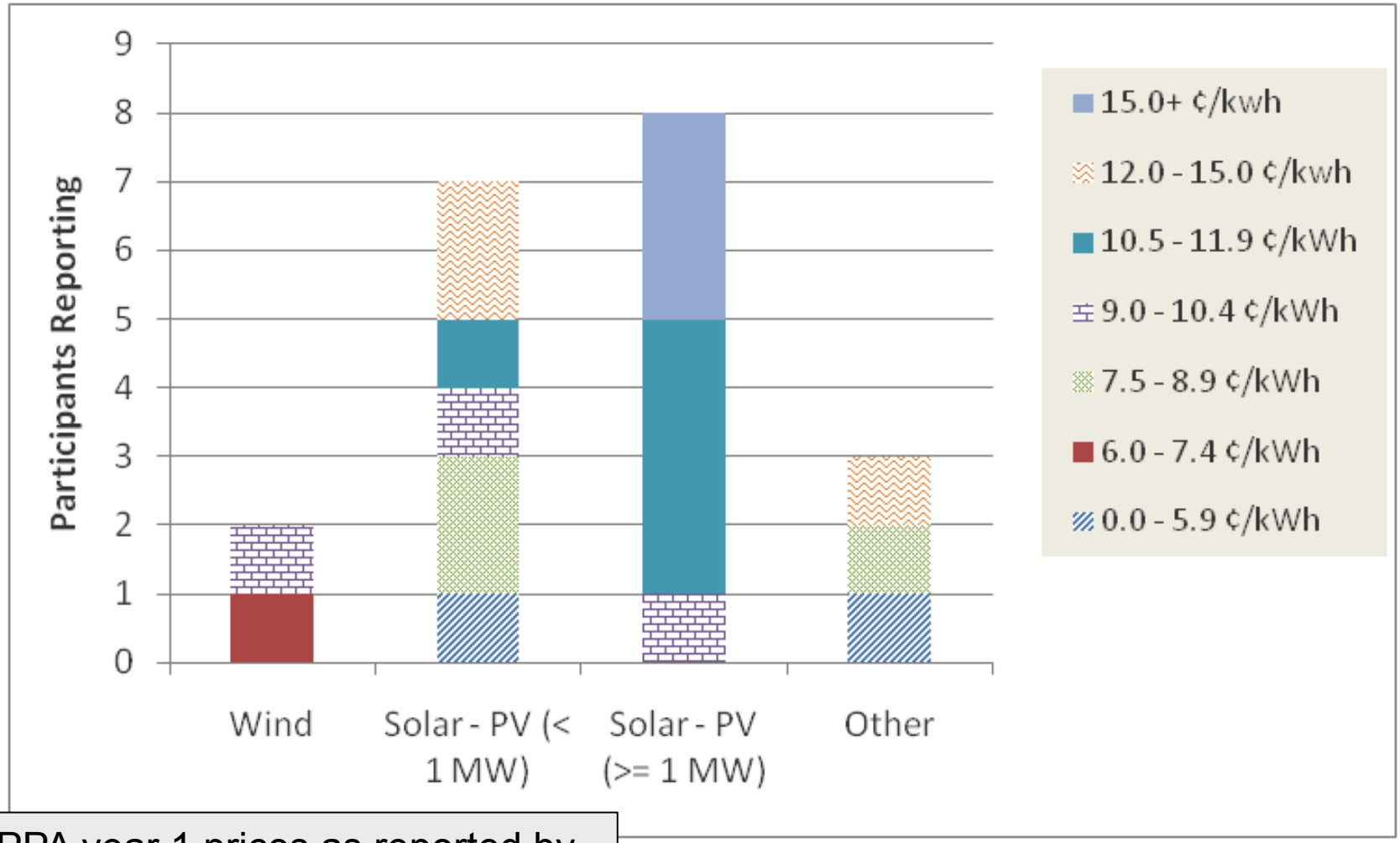
Comments

PPA Duration



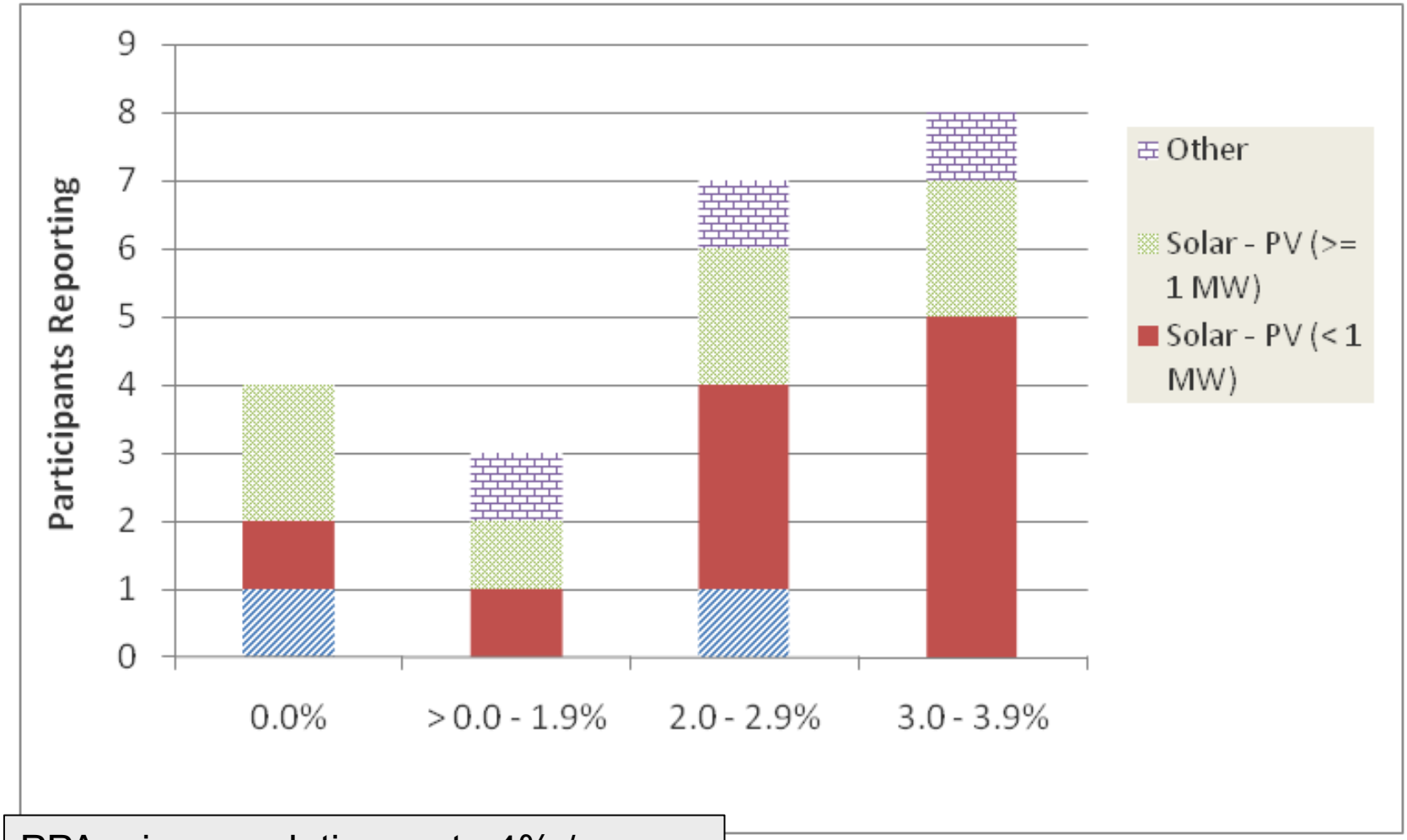
PPA tenor mostly in the 15-20 year range

PPA Price – Year 1



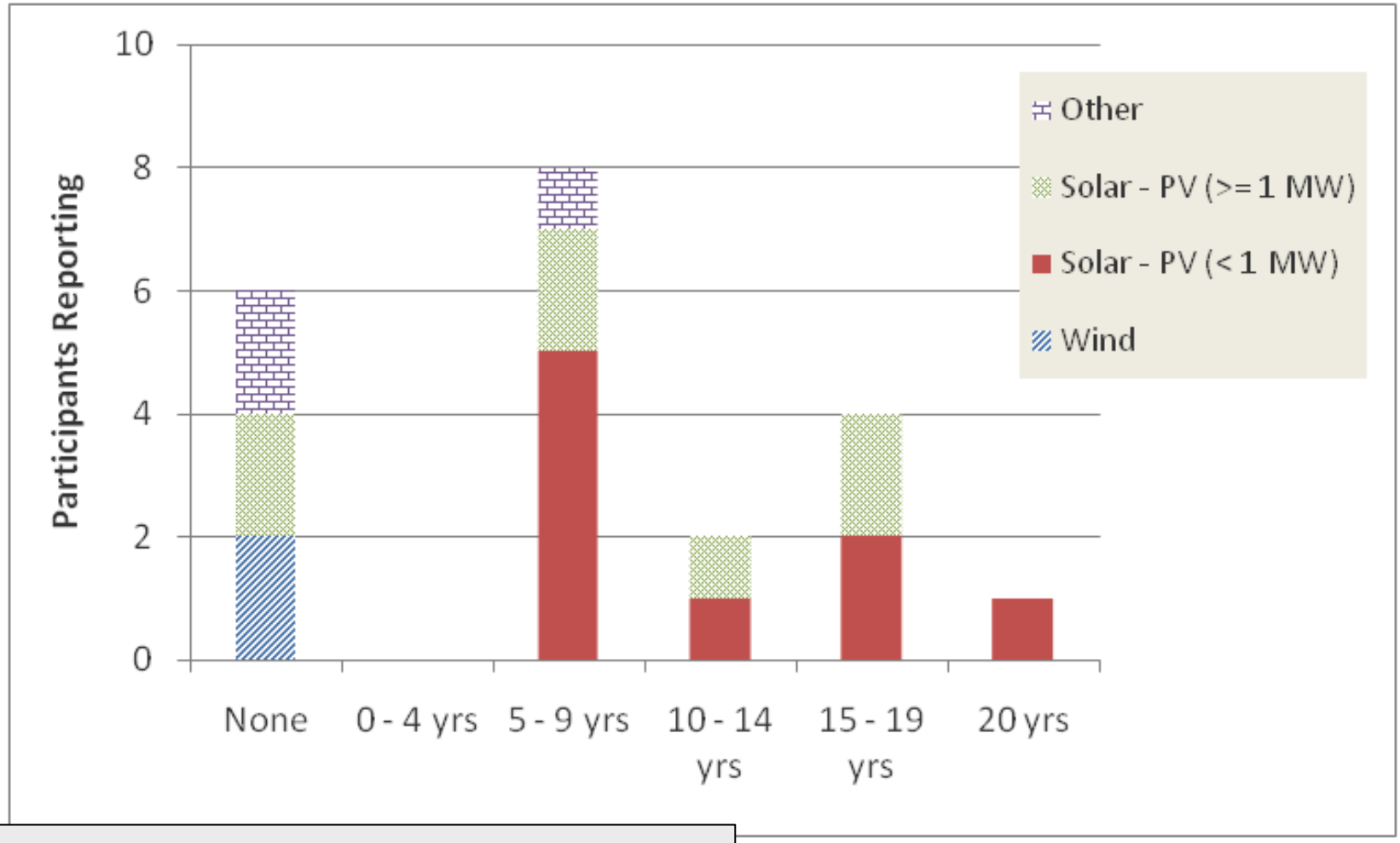
PPA year 1 prices as reported by REFTI participants

PPA Price Escalation



PPA price escalation up to 4% / year; sometimes at 0% / year

PPA Customer Buyout Option



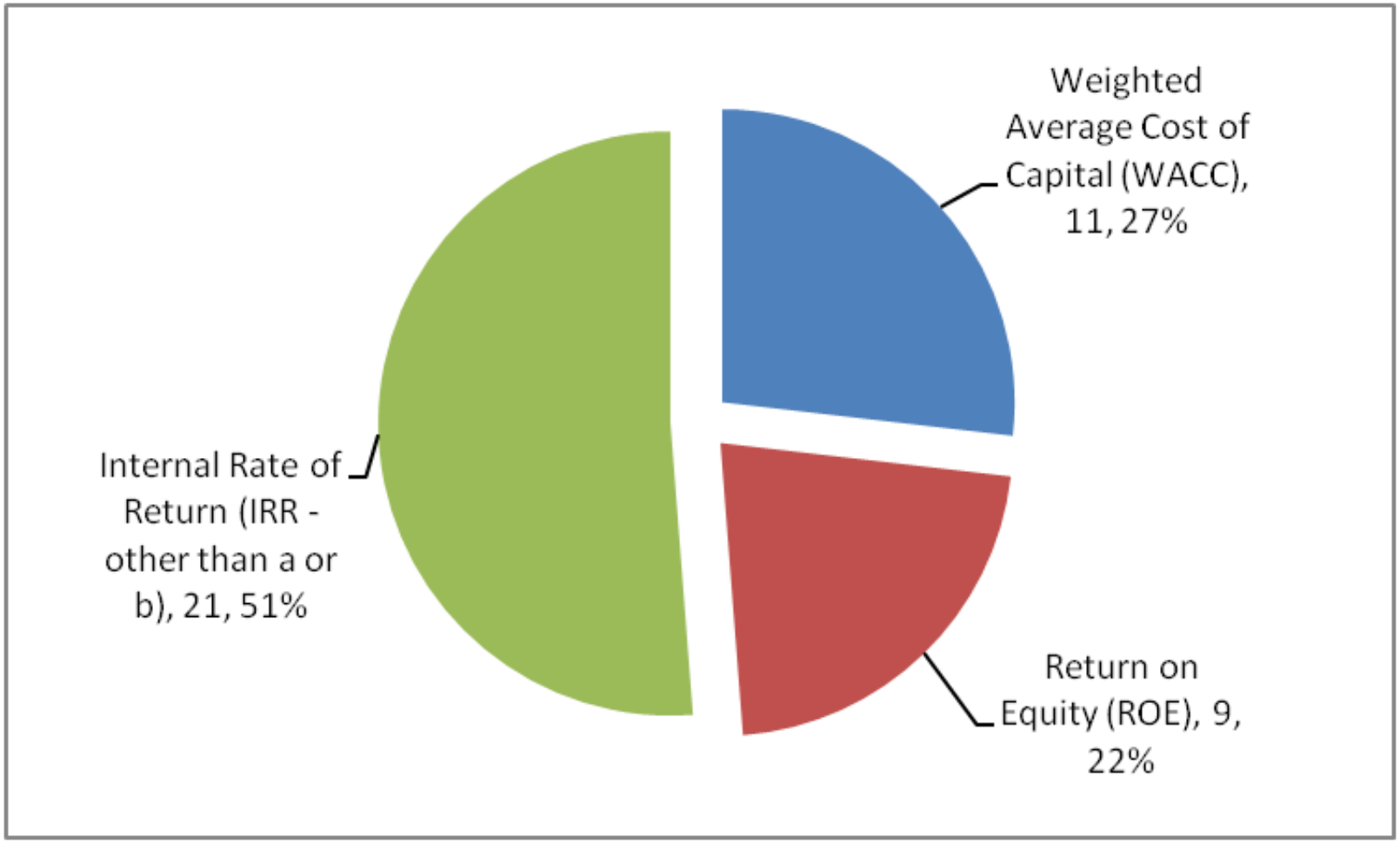
Small PV systems frequently allow customer buyout in the 5-9 year range

Participant Feedback on PPAs

"Customer buyouts after 6/10/15 years at greater of predetermined value or FMV. Starting PPA rate varied hugely by area. Aimed to provide solar energy at 10-15% below grid energy."

Webinar Poll # 2:

How do you set the discount rate used in your financial models?



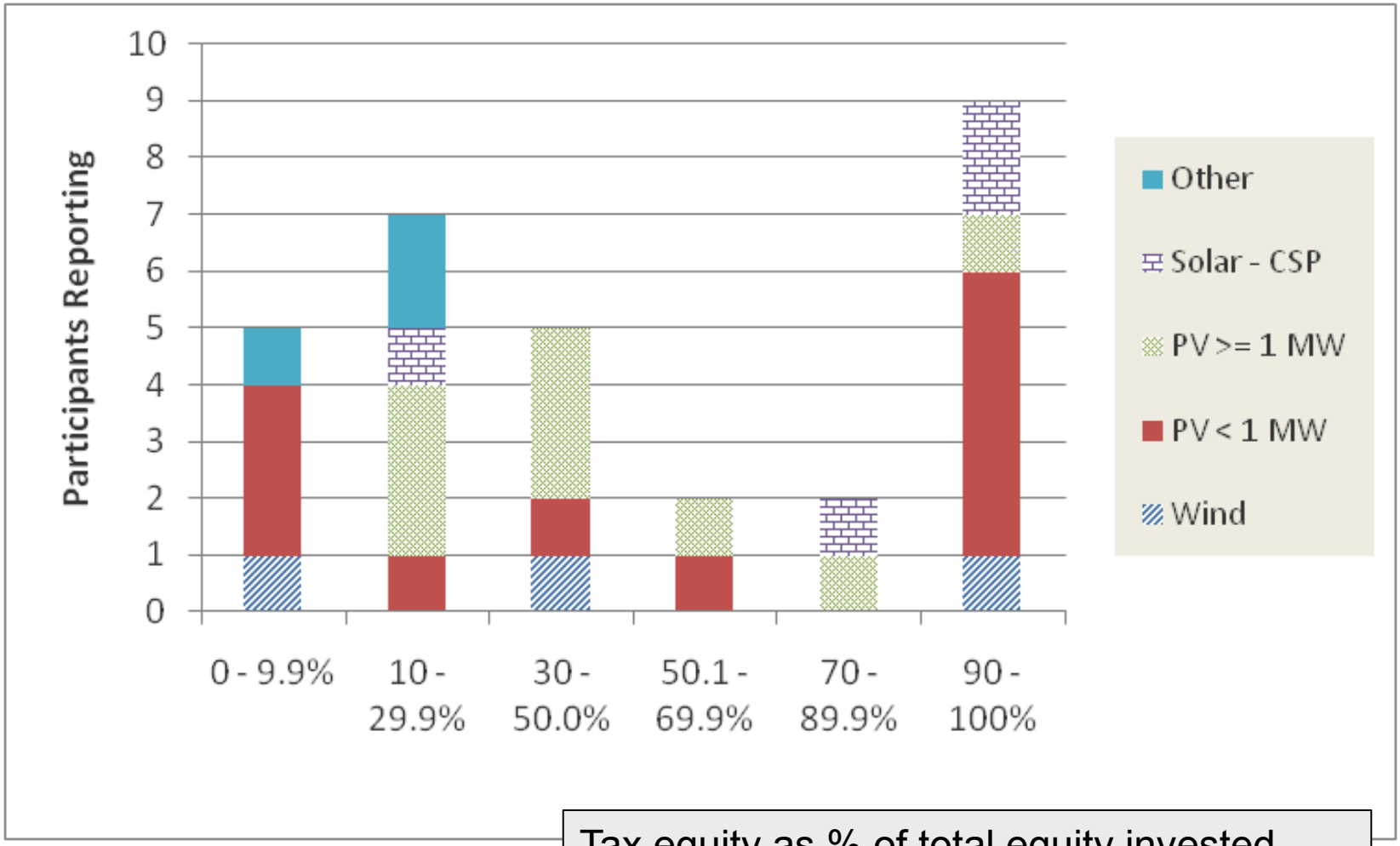
REFTI Questionnaire: Page 3, Q5

5. Regarding project EQUITY CAPITAL (based on after-tax returns), please tell us how your projects are generally structured...

	Ratio of Tax-Investor Equity / Total Capital	Expected Return on Tax-Investor Equity	Ratio of Developer Equity / Total Capital	Expected Return on Developer Equity
Wind				
Solar - PV (< 1 MW)				
Solar - PV (>= 1 MW)				
Solar - CSP				
Solar Thermal (non-elec)				
Geothermal				
Biomass - Elec				
Biomass - Non-elec				
Hydro				
Other Technologies				

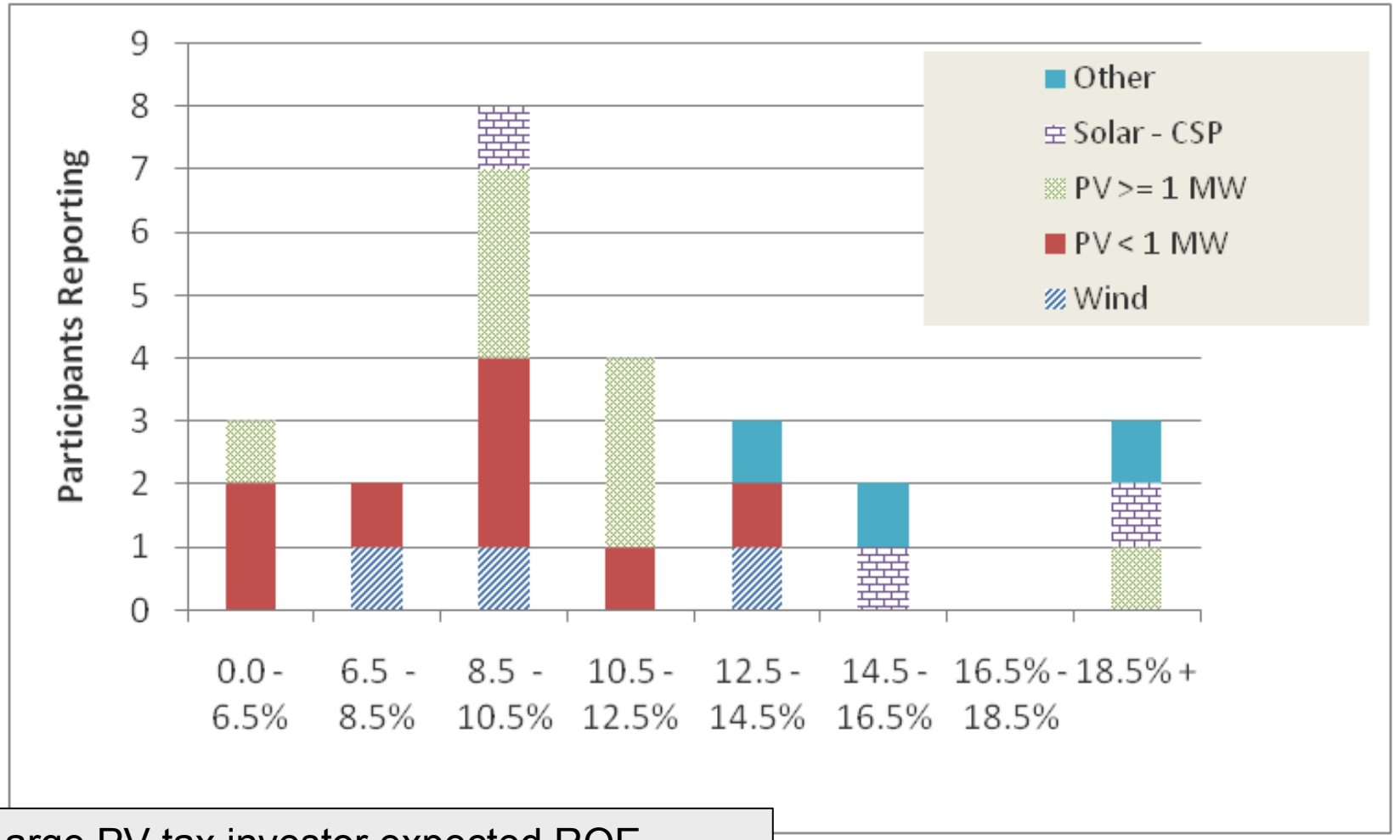
Comments

Tax Equity as % of Total Equity



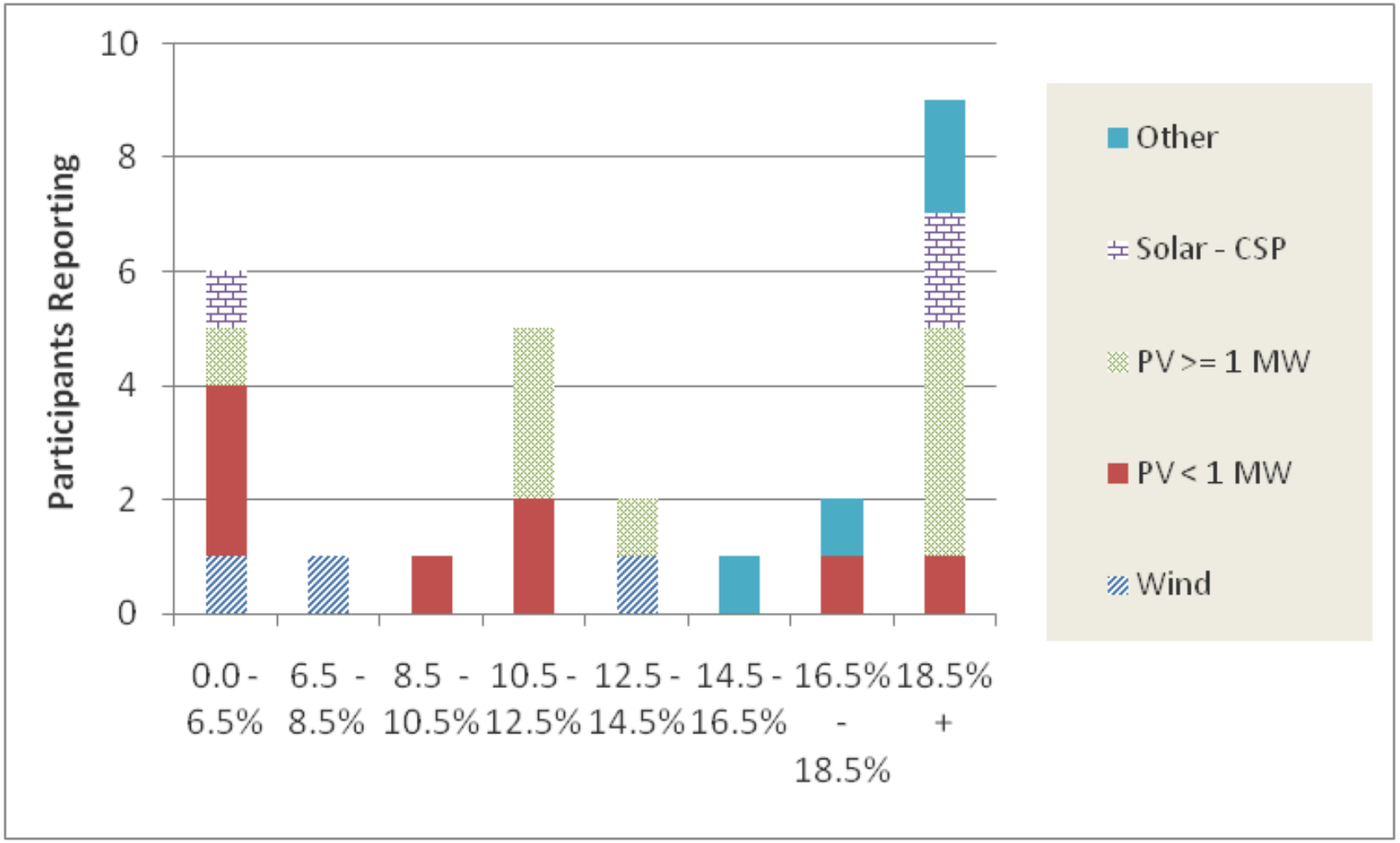
Tax equity as % of total equity invested ranges widely within RE technologies

Expected Return on Tax-Investor Equity



Large PV tax investor expected ROE primarily in the 8.5% - 12.5% range.

Expected Return on Developer Equity



Expected return on developer equity varies widely, particularly for solar, less so for wind. Other technologies all reporting very high expected developer ROE

Participant Feedback on Equity Returns

"Structure, tenor, yields vary greatly from fund to fund."

"Difficult to answer due to wide variation in project structures we closed in Q4 2009, e.g. investor capital ranged from 55% of equity to 90%."

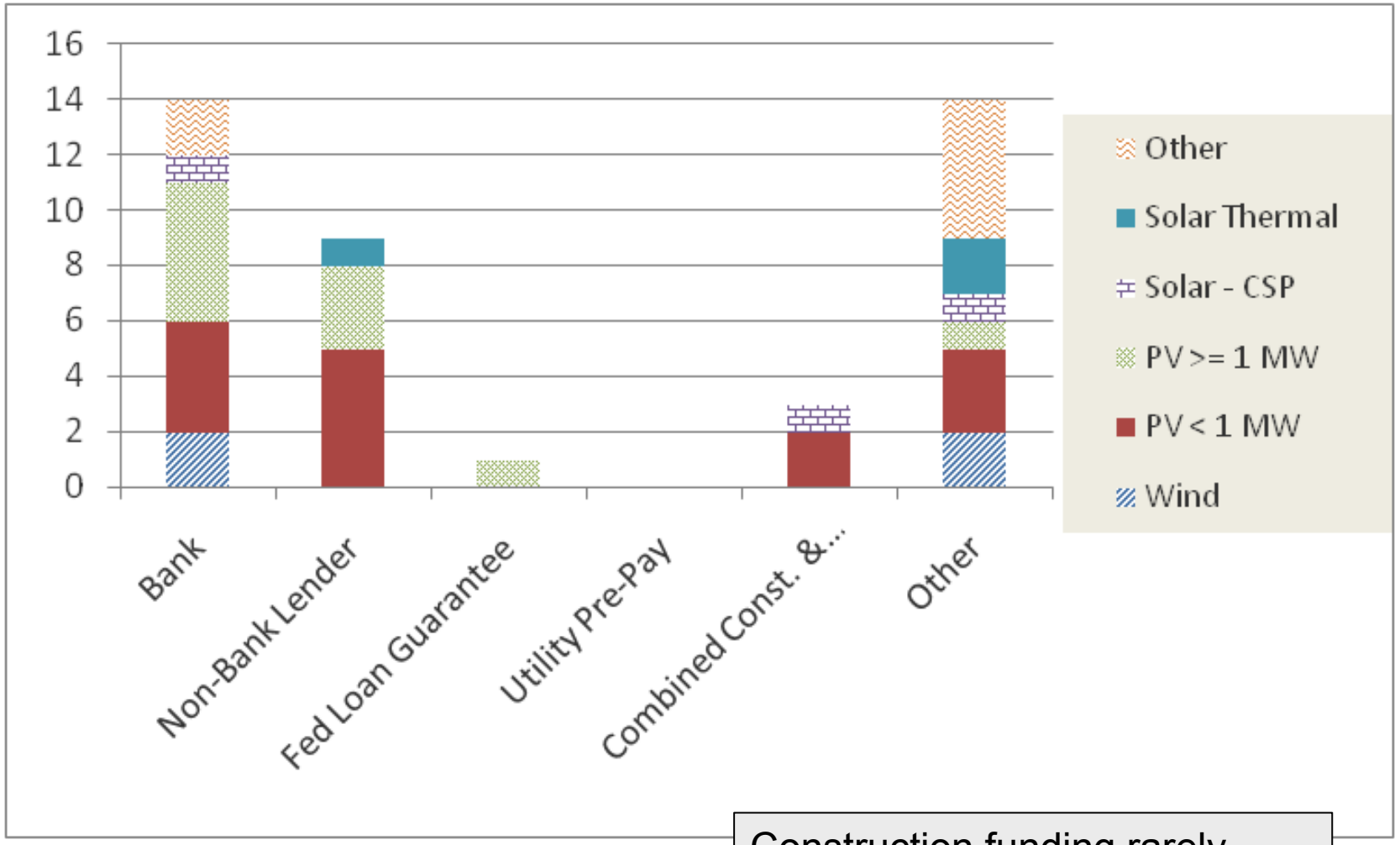
REFTI Questionnaire: Page 3, Q6

6. Regarding project-level CONSTRUCTION debt, please tell us how your projects are generally structured...

	Source of Const. Debt	Ratio of Const. Debt / Total Capital	Average All-In Cost of Const. Debt (%)	Const. Debt Term (months)
Wind				
Solar - PV (< 1 MW)				
Solar - PV (>= 1 MW)				
Solar - CSP				
Solar Thermal (non-elec)				
Geothermal				
Biomass - Elec				
Biomass - Non-elec				
Hydro				
Other Technologies				

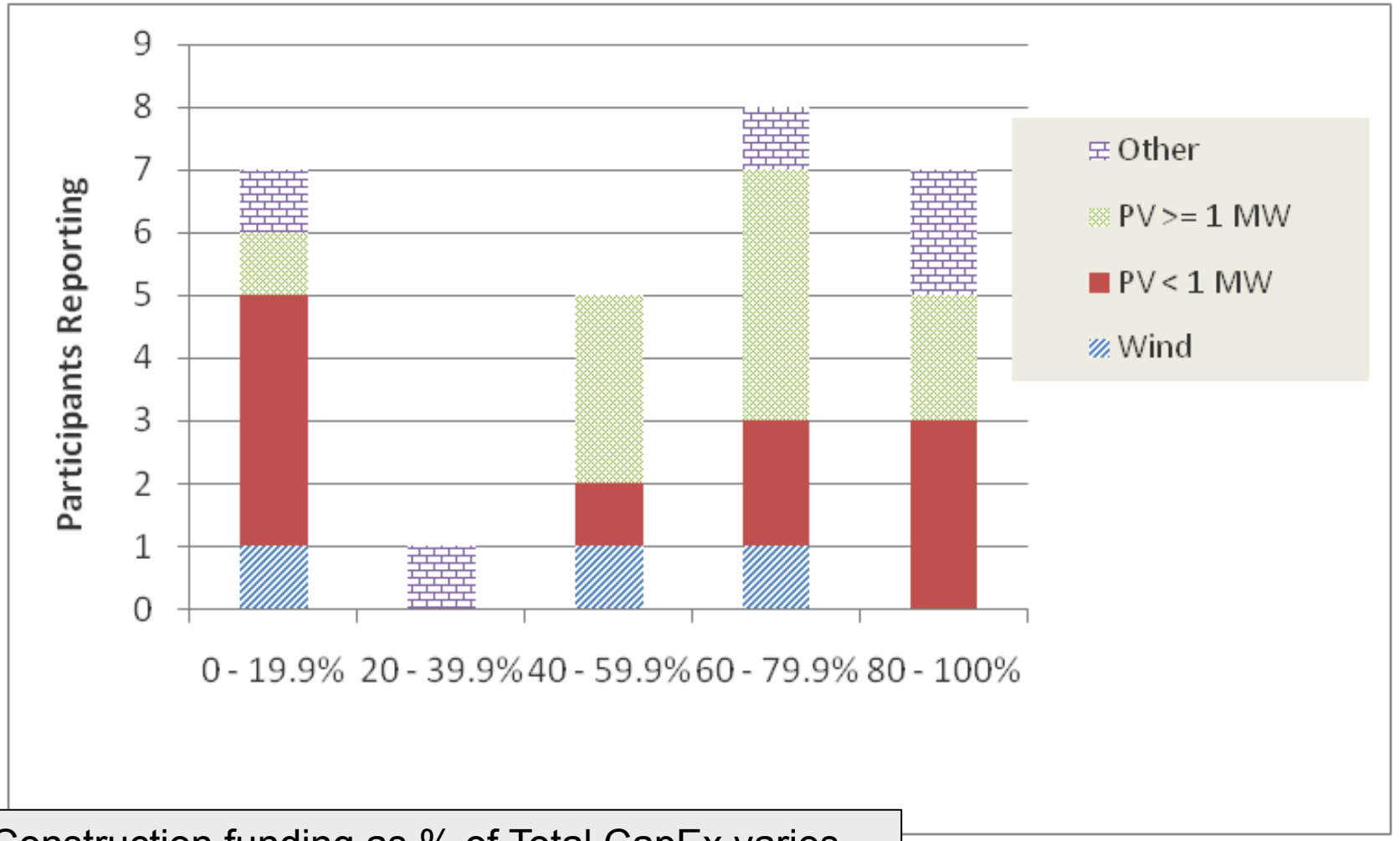
Comments

Source of Construction Financing



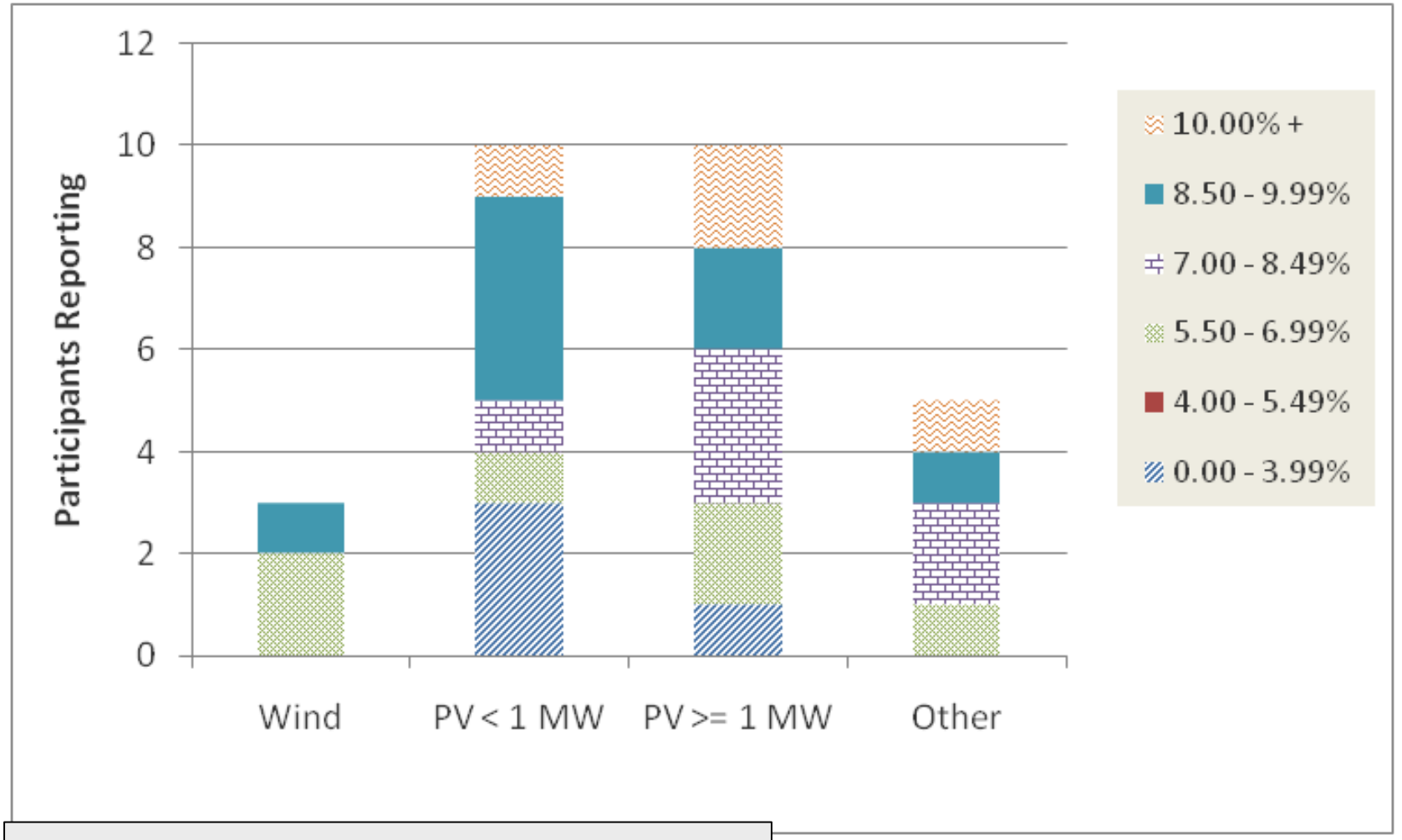
Construction funding rarely combined with term loan.

Construction Financing as % of Total CapEx



Construction funding as % of Total CapEx varies widely by project, no set development model

Cost of Construction Financing (all-in)



Construction loans also vary greatly in interest rates offered, even by technology

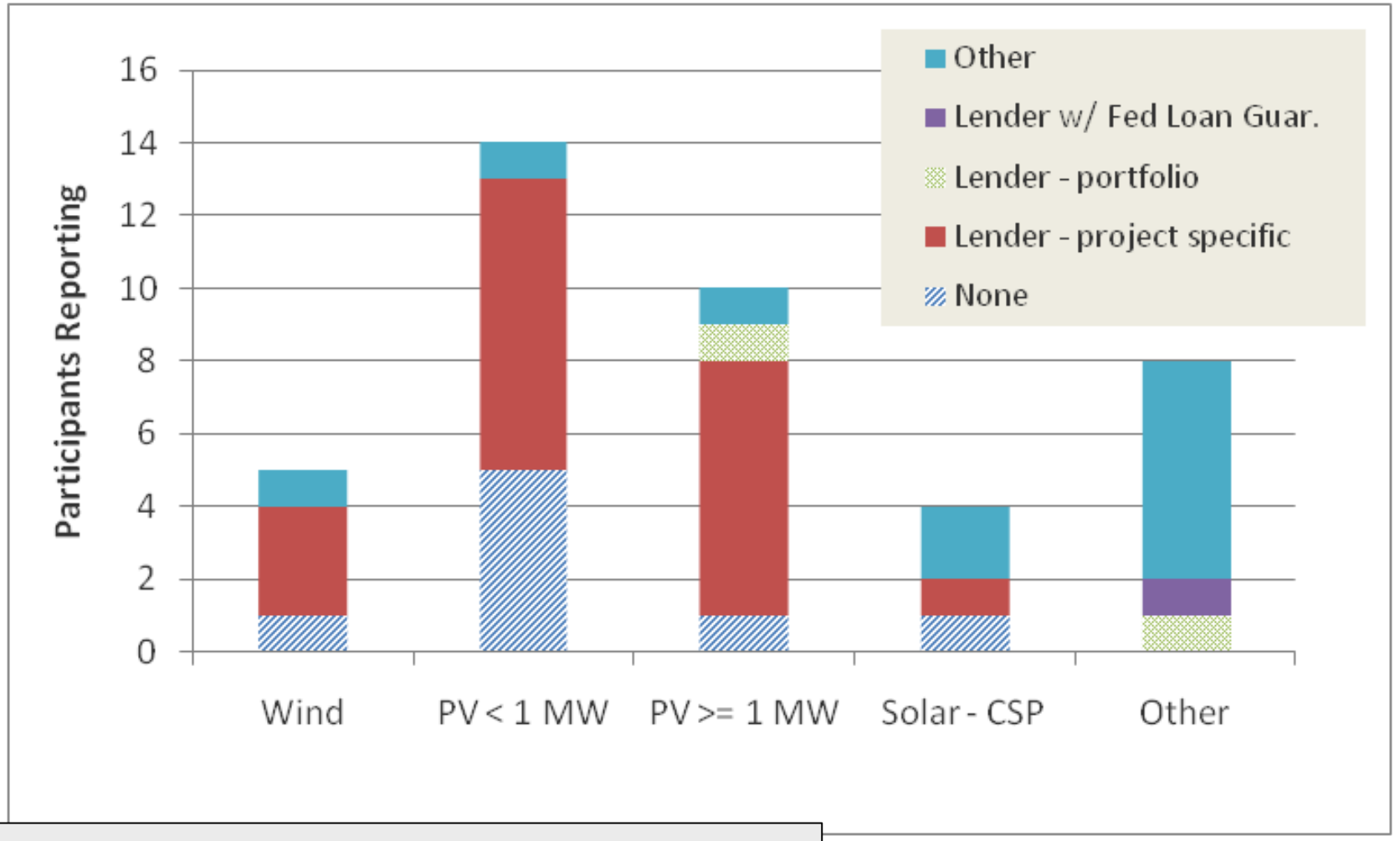
REFTI Questionnaire: Page 3, Q7

7. Regarding project-level TERM debt, please tell us how your projects are generally structured...

	Source of Debt	Ratio of Debt / Total Capital	Ratio of Fed Loan Guarantee / Debt	Avg. All-In Cost of Debt (%)	Debt Term (yrs)	Avg. Debt Coverage Ratio Required
Wind						
Solar - PV (< 1 MW)						
Solar - PV (>= 1 MW)						
Solar - CSP						
Solar Thermal (non-elec)						
Geothermal						
Biomass - Elec						
Biomass - Non-elec						
Hydro						
Other Technologies						

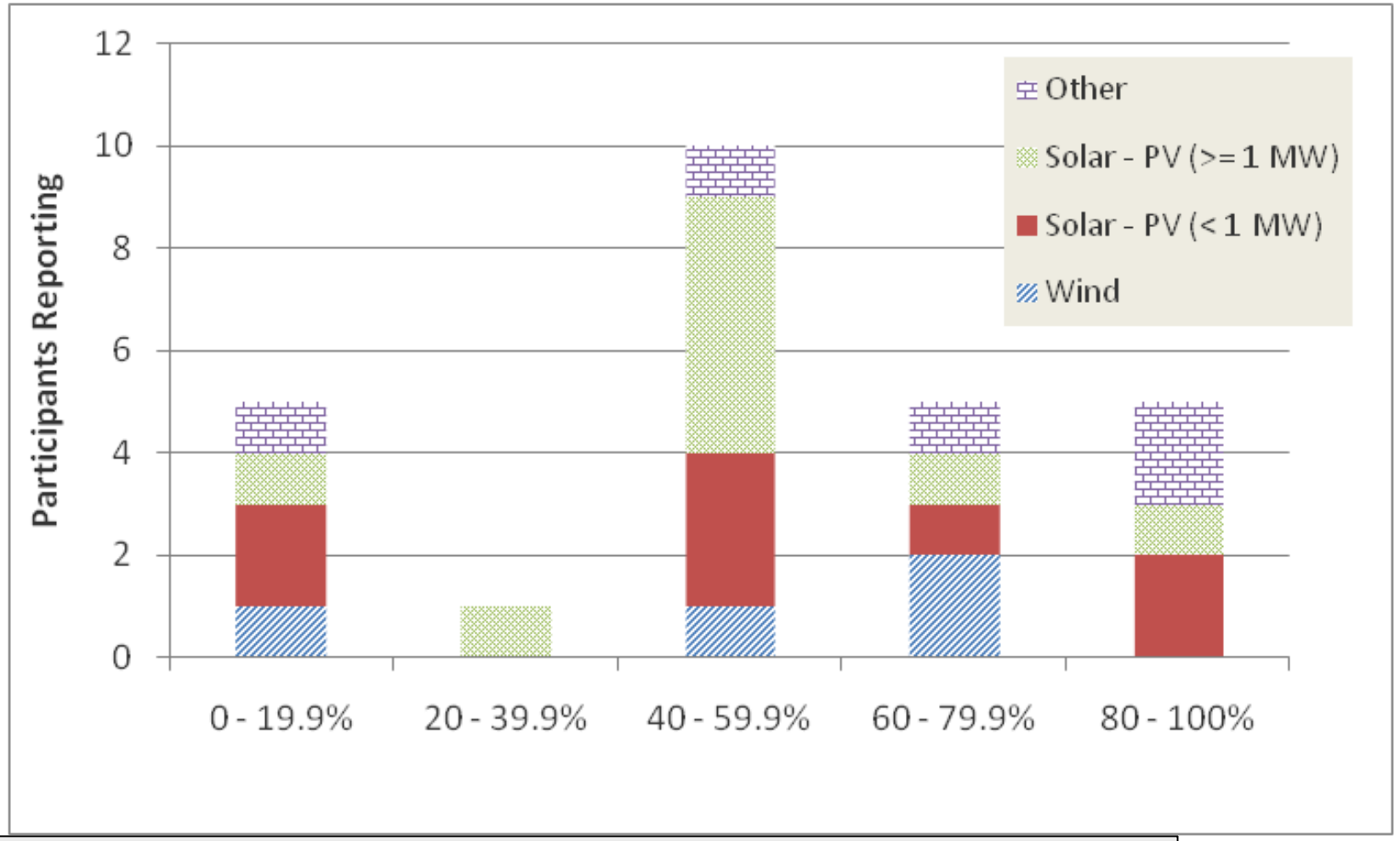
Comments

Source of Term Debt



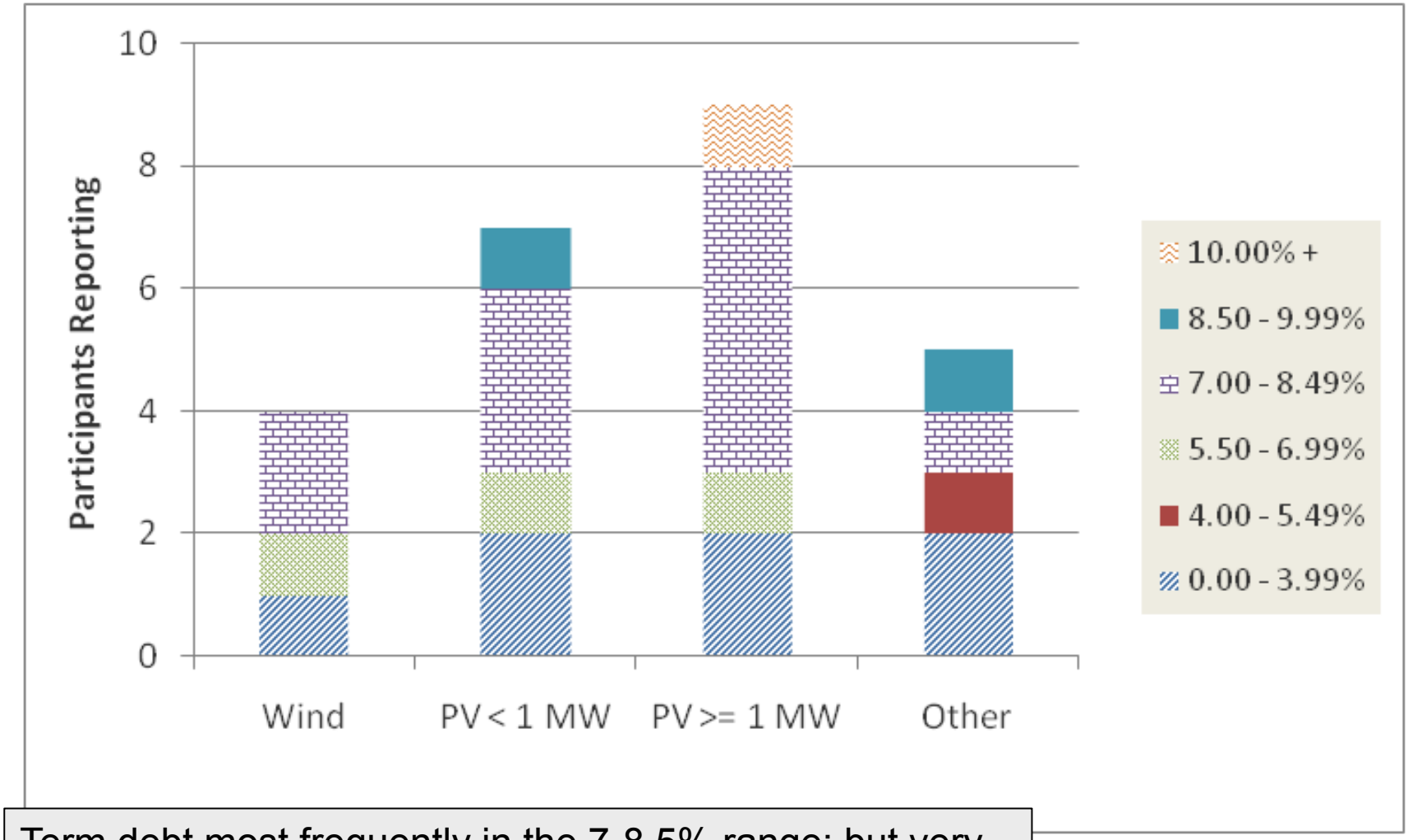
Term debt primarily on project-specific basis;
Very little portfolio financing reported

Term Debt as % of Total CapEx



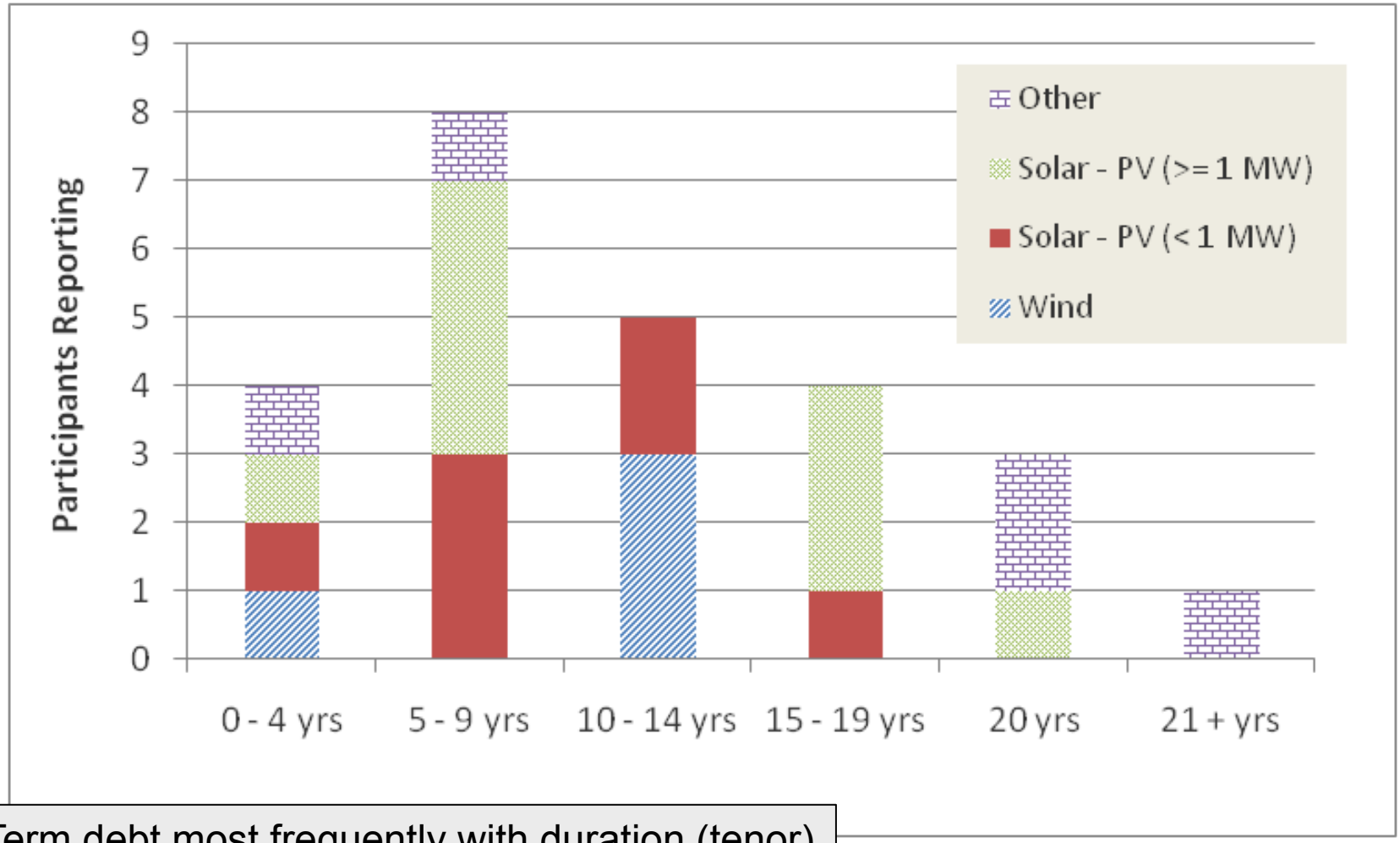
Debt most commonly in the 40 – 60% of capitalization bin

Cost of Term Debt (all-in)



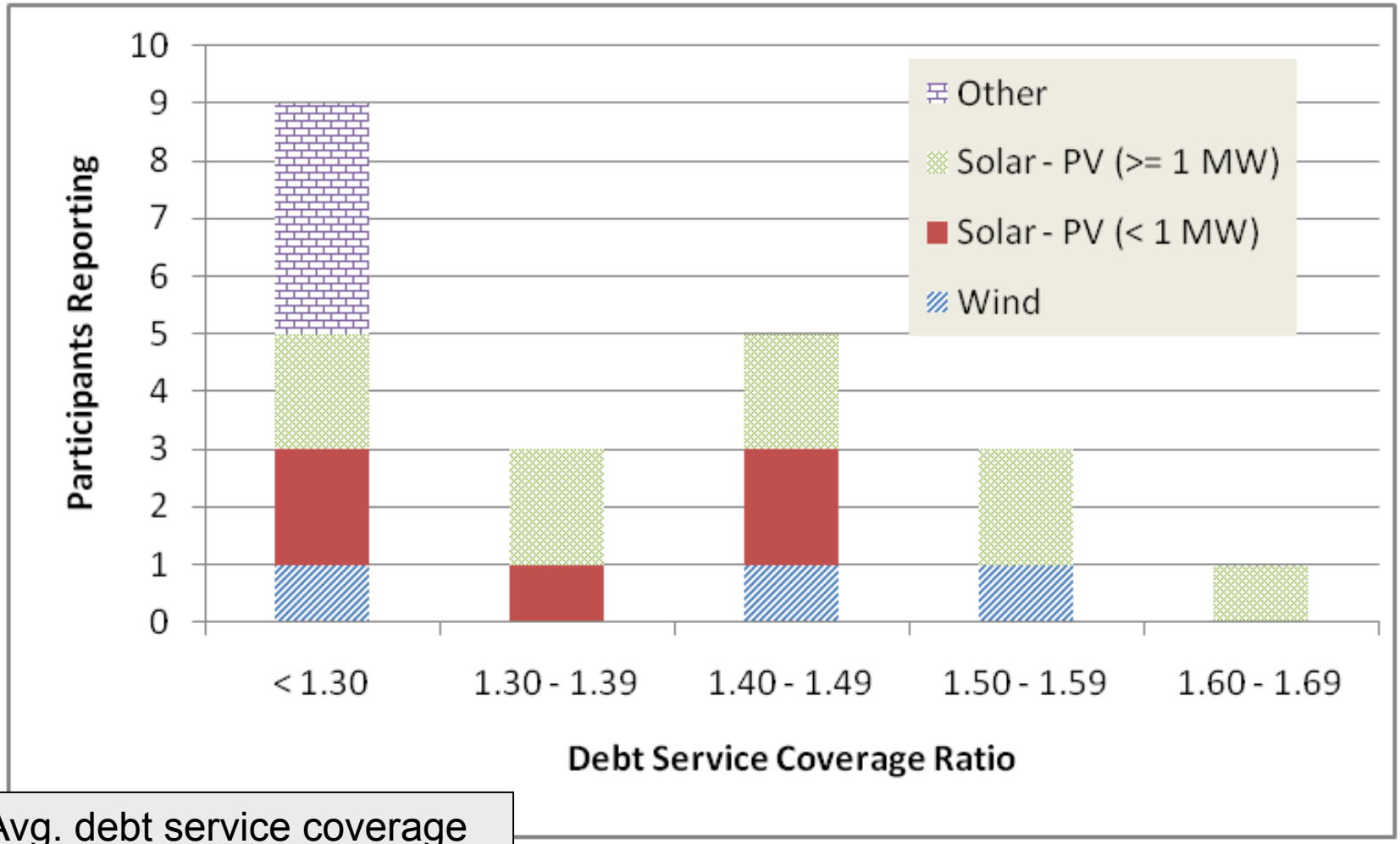
Term debt most frequently in the 7-8.5% range; but very low cost debt reported across all technologies

Term Debt Duration



Term debt most frequently with duration (tenor) of 5-9 years (*i.e.*, mini-perm)

Debt Service Coverage Ratios Required



Avg. debt service coverage ratios required; most frequently < 1.3

REFTI Questionnaire: Page 3, Q8

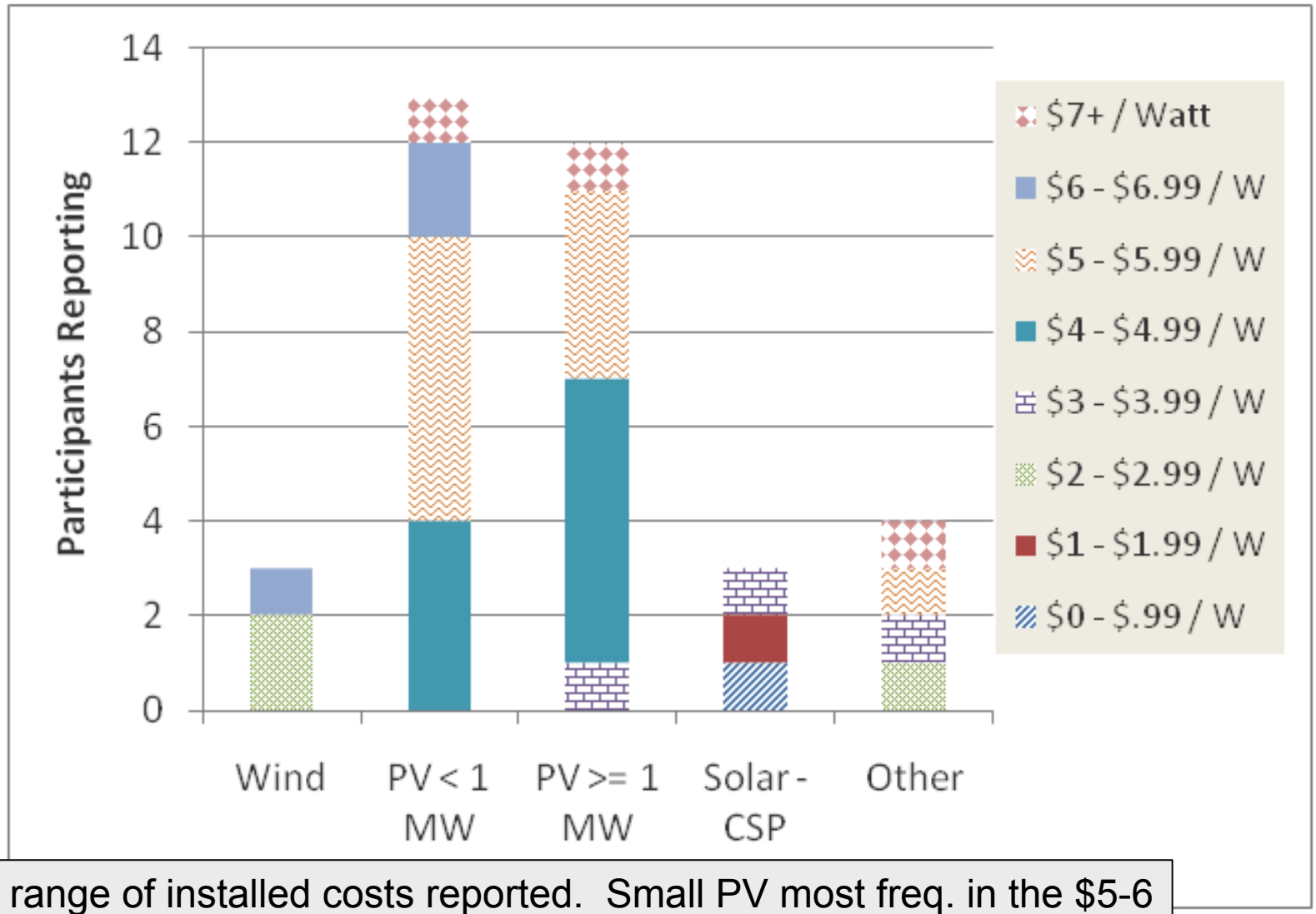
8. Provide the average INSTALLED COSTS (before incentives) and LEVELIZED COST OF ENERGY (LCOE) (after incentives) from your projects

(LCOE is generally the present value of costs divided by the present value of energy delivered)

	Installed Costs ($ / Watt - net output)	LCOE (cents / kWh)
Wind		
Solar - PV (< 1 MW)		
Solar - PV (>= 1 MW)		
Solar - CSP		
Solar Thermal (non-elec)		
Geothermal		
Biomass - Elec		
Biomass - Non-elec		
Hydro		
Other Technologies		

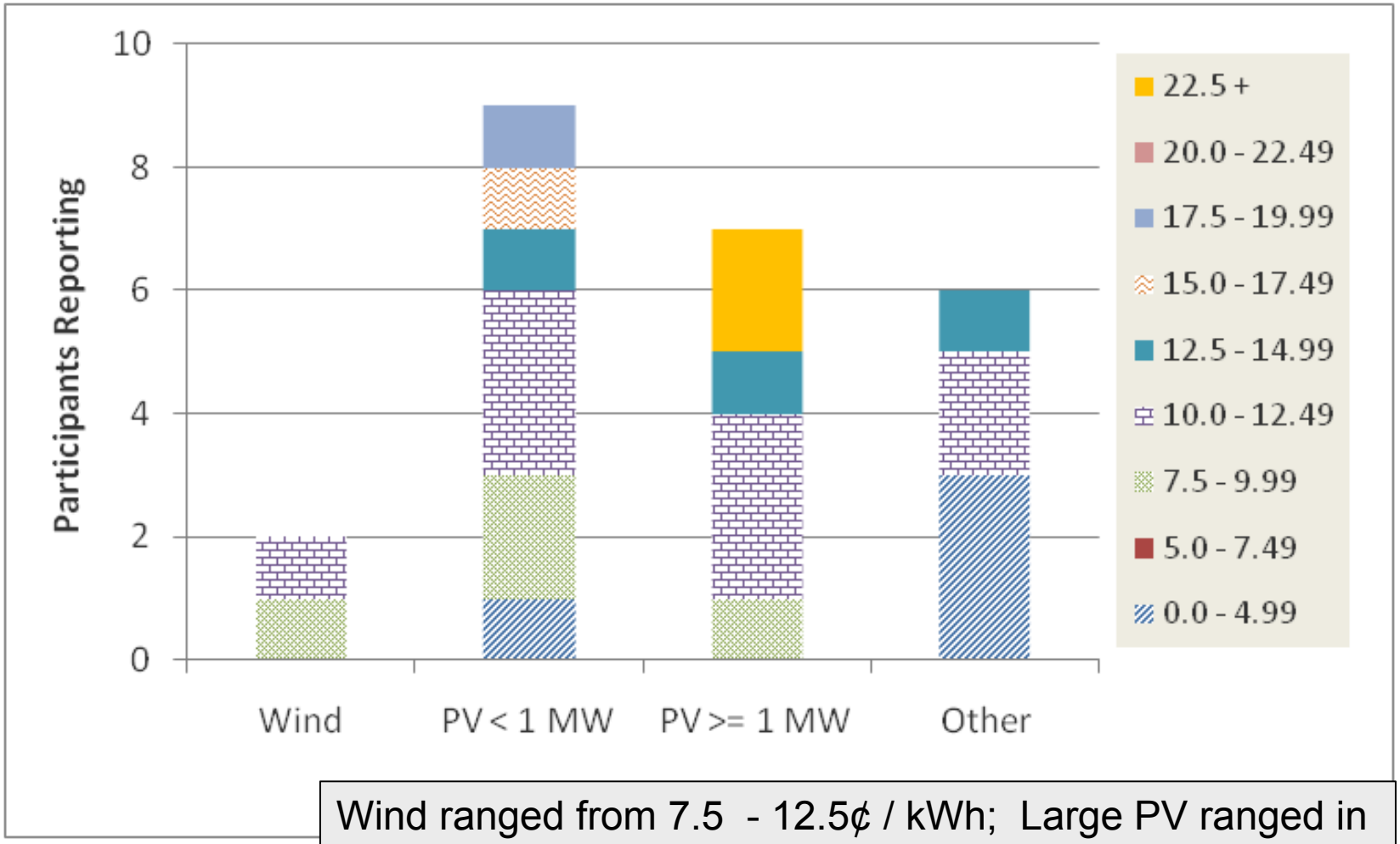
Comments

Installed Costs (before incentives)



Wide range of installed costs reported. Small PV most freq. in the $5-6 range; Large PV most freq. in $4-5 range; wind in the $2-3 range

Levelized Cost of Energy (in cents / kWh)



Wind ranged from 7.5 - 12.5¢ / kWh; Large PV ranged in LCOE from 7.5 – 10¢ / kWh to over 22.5 ¢ / kWh; Other techs reported below 15 ¢ / kWh, several below 5 ¢ / kWh

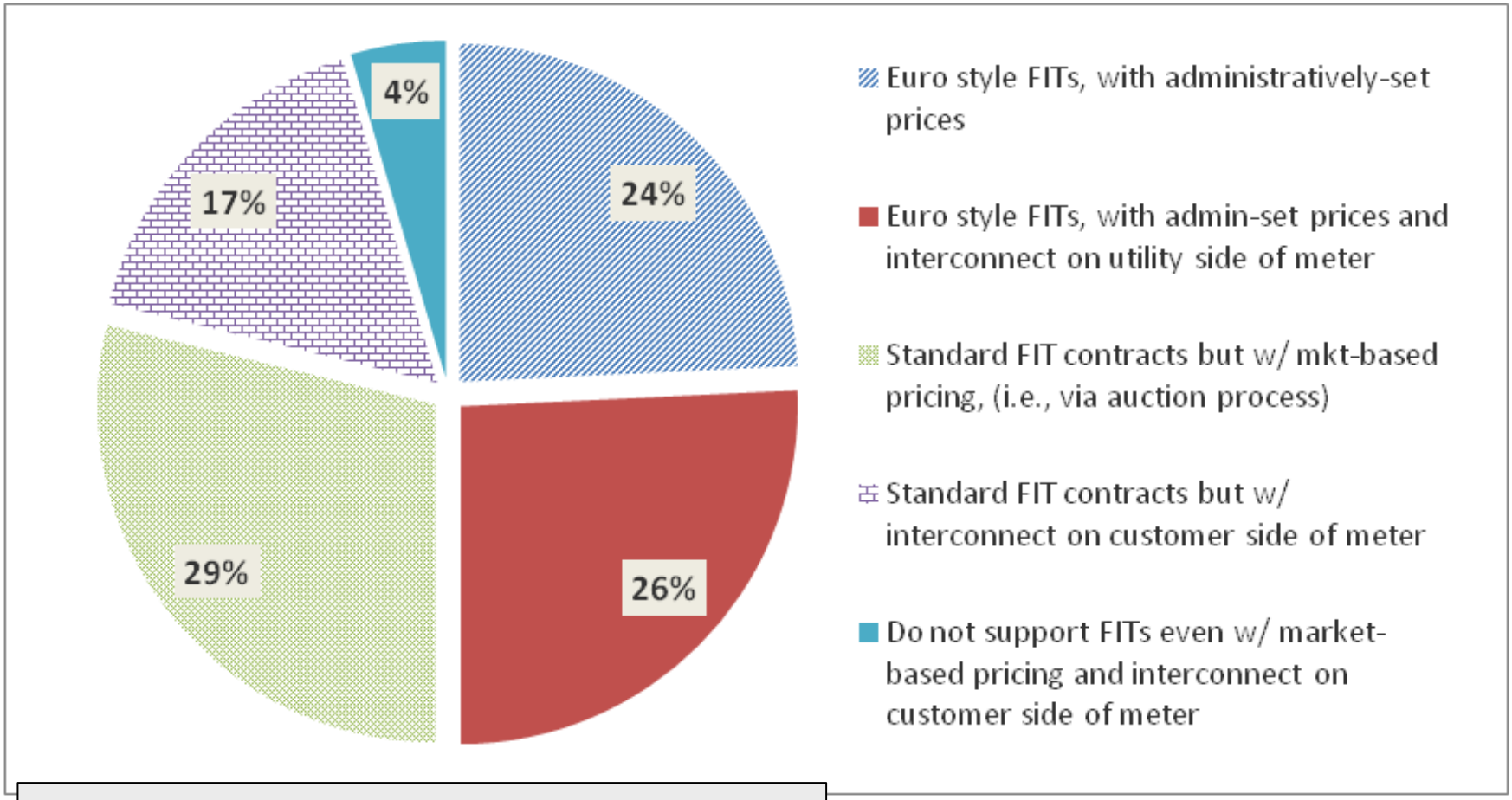
REFTI Questionnaire: Bonus Q1

1. Regarding the general availability of Feed In Tariffs (FITs)...

- [ ] I support Euro style FITs, with administratively-set prices
- [ ] I support Euro style FITs, with administratively-set prices and interconnect on utility side of meter
- [ ] I support standard FIT contracts but w/ mkt-based pricing, (i.e., via auction process)
- [ ] I support standard FIT contracts but w/ interconnect on customer side of meter
- [ ] I do not support FITs even w/ market-based pricing and interconnect on customer side of meter

Comments

Bonus Question 1: FIT Policy Support



29% would like to see FIT prices set through market-based pricing (i.e., via an auction)

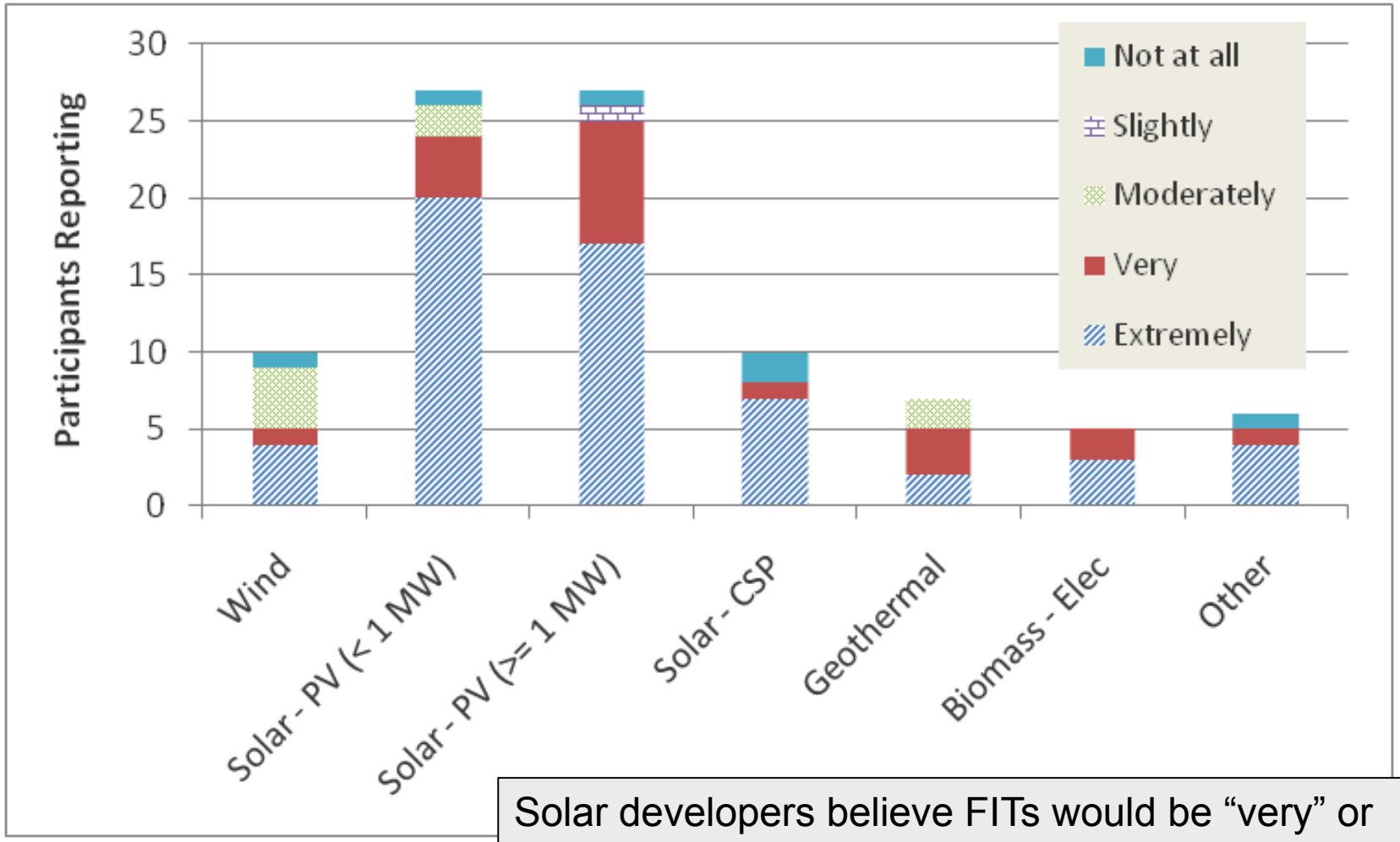
REFTI Questionniare, Bonus Q2

2. FITs would help development of projects I work on...

	Helpfulness of FIT policies
Wind	
Solar - PV (< 1 MW)	
Solar - PV (>= 1 MW)	
Solar - CSP	
Geothermal	
Biomass - Elec	
Biomass - Non-Elec	
Other Technologies	

Comments

Bonus Question 2: Helpfulness of FIT



Solar developers believe FITs would be “very” or “extremely” helpful to develop projects;
Wind developers less convinced

Participant Comments on FITs

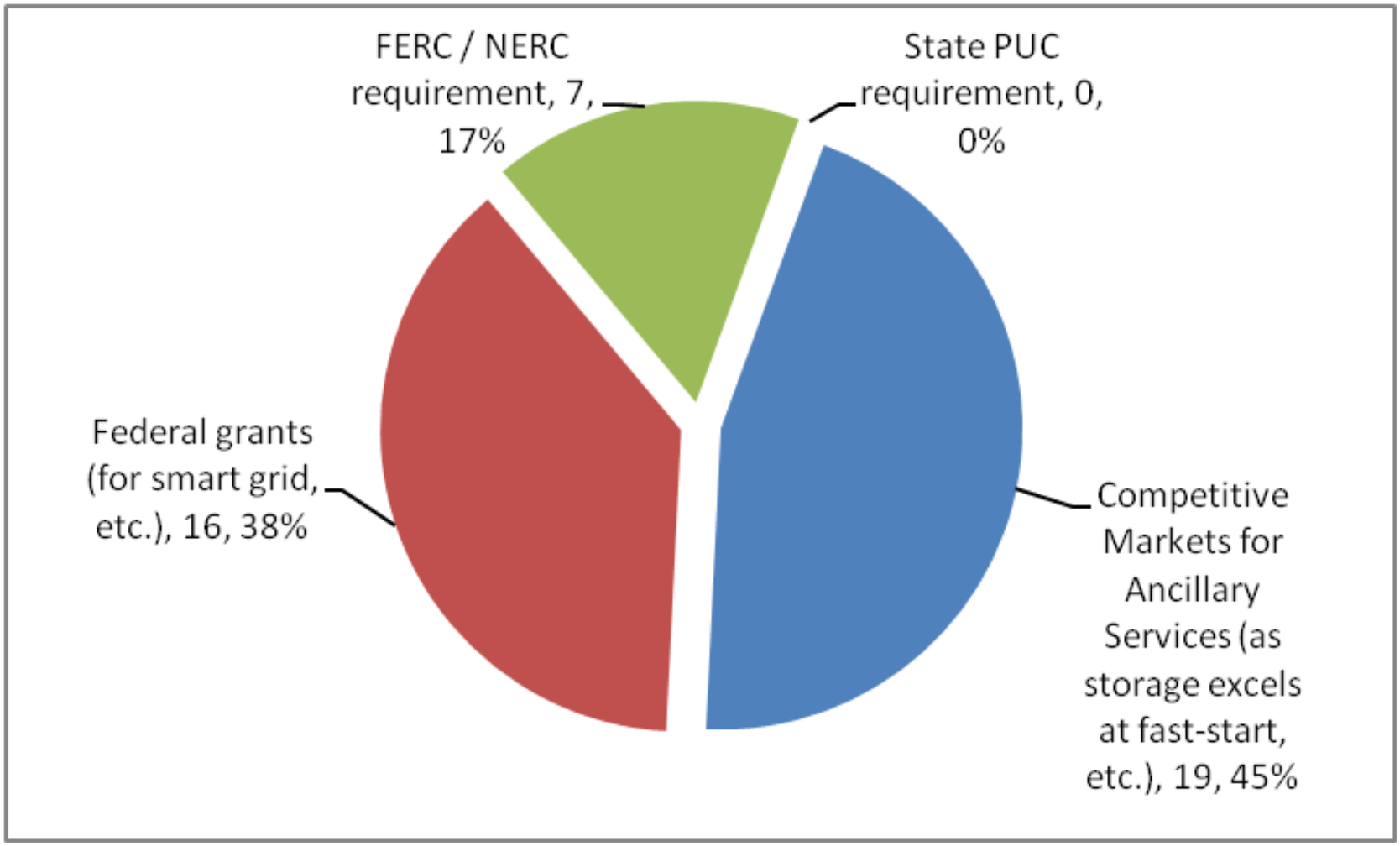
"FIT's help sh*@#y solutions gain traction when they should be allowed to fail."

"Over 1Billion citizens in 26 countries and now using FIT's to stimulate the move to Renewables. These policies have been shown to be effective and workable and the best market drivers known to man…"

"Implementing Euro-style FITs in the US would require amendments to the Federal Power Act."

Webinar Poll #3:

What is best mechanism / policy to deploy storage?



Data Confidentiality

- Ensuring REFTI data confidentiality critical to NREL

- Data gathered through REFTI will only be utilized for:
  - *Providing aggregate values for model inputs*
  - *Reporting trends*
  - *Participant-specific data will not be utilized or distributed in any way*

- Non-disclosure agreements are available
  - *Executing an NDA is fully voluntary*
  - *3 – 12 month NDAs available*

- Please let us know if you have any concerns over data provided through this webinar
  - *Slides will not be made available immediately to allow time to raise concerns*

- Q4 Survey still available for review only

Thank you!

Thanks for your participation!

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michael.mendelsohn@nrel.gov
303/384-7363

Current (Q1 2010) REFTI Questionnaire available at:

<

http://www.surveymonkey.com/s/YWH3KG5 >